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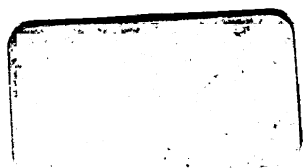
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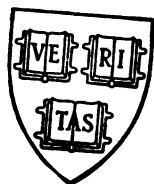
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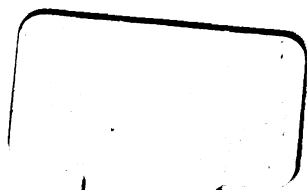


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TABLE OF CONTENTS

	PAGE
INTRODUCTION	3
SINGLE NATIONAL RAILWAY REGULATION	5
From National Republican Platform.	
AMERICAN RAILWAYS IN 1837—Illustrated.	6
David Stevenson (London, 1838).	
A PIONEER OHIO RAILROAD—Illustrated.	25
From the <i>Carrollton Free Press Standard</i> .	
THE TUNKHANNOCK VIADUCT—Illustrated.	29
EVOLUTION OF THE NEW YORK CENTRAL—Illustrated.	30
CAREER OF JAMES J. HILL (with portrait)	47
From the <i>New York Times</i> .	
THE INTERSTATE COMMERCE COMMISSION AND ITS WORK	56
Commissioner E. E. Clark.	
AN UNFORTUNATE RAILROAD PROJECT	69
From <i>Railway Engineering</i> .	
THE NORTHERN RAILWAY OF FRANCE IN WAR TIME	71
Translation from the <i>Journal des Transports</i> .	
THE BRITISH RAILWAYS IN 1915—Illustrated.	75
From the <i>London Statist</i> .	
GERMAN RAILWAYS IN THE WAR	79
Statement by the German General Staff.	
SWISS RAILWAYS IN WAR TIME	84
Correspondence of <i>The Railway Gazette</i> .	
THE RAILWAYS IN A SYSTEM OF NATIONAL DEFENSE	88
W. L. Park.	
PREPAREDNESS OF OUR RAILROADS	100
George Dallas Dixon.	
STATISTICAL COMPARISON BETWEEN AMERICAN AND GERMAN RAILWAYS	107
W. A. Schulze (translation)	
GOVERNMENT REGULATION AND OUR TRANSPORTATION SYSTEM	122
Hon. O. W. Underwood.	
A WISCONSIN VIEW OF THE RAILWAY SITUATION	128
Hon. E. L. Phillip.	
GOVERNMENT OWNERSHIP IN CANADA	139
Frank Trumbull.	
RAILWAY MAIL PAY	143
Alan V. Arragon.	
SHALL UNCLE SAM OWN THE RAILWAYS?	156
Richard Hoadley Tingley.	
CONFLICT BETWEEN STATE AND FEDERAL REGULATION	160
Walker D. Hines.	
STATE LEGISLATION RELATING TO OPERATION	168
From the <i>Railway Age-Gazette</i> .	
THE GOVERNMENT AND THE RAILROADS	171
Otto H. Kahn.	
THE PUBLIC INTEREST IN TRANSPORTATION	185
William Sproule.	
WHY TEXAS RAILROADS ARE IN RECEIVER'S HANDS	195
From the <i>Railway Age-Gazette</i> .	
POOLING BEFORE THE COMMERCE ACT	200
Charles Francis Adams (1878)	
COMPETITION AND COMBINATION IN PRACTICE	211
Arthur Twining Hadley (1885).	
HOW TRAFFIC ASSOCIATIONS ARE ORGANIZED	224
F. A. Leland.	
OBSERVATIONS OF AN OPERATING OFFICER	226
Elisha Lee.	
ANALYSIS OF THE WATERWAYS MOVEMENT	236
H. G. Moulton.	
THE FEDERAL VALUATION OF UTILITIES	250
Charles A. Prouty.	
FEDERAL VALUATION OF UNITED STATES RAILROADS	259
Thomas W. Hulme.	
DEPRECIATION AND APPRECIATION OF RAILWAY PROPERTY	267
W. H. Forse, Jr.	
REGULATION OF RAILROAD FINANCE AND ORGANIZATION	281
W. M. Acworth.	
REGULATION OF RATES BY FEDERAL GOVERNMENT ALONE	289
William A. Glasgow, Jr.	
THE PUBLIC CARRIER AND THE WAGE SCALE	296
Hon. Charles Nagel.	
SLEEPING CAR TRAVEL IN AMERICA AND GERMANY	308
Prof. Gustav Schimpff (translation)	
STATISTICS OF AMERICAN RAILWAYS FOR THE YEAR ENDED JUNE 30, 1915	313
Slason Thompson.	

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INTRODUCTION

Following the approved practice of its predecessors, the seventh annual issue of *The Railway Library* prefaces the more noteworthy addresses and papers of the year 1915 with several articles descriptive of early railroading in the United States. Only by occasional recurrence to such illustrated pen pictures of the past can the student of the railways of today obtain any adequate conception of the marvelous developments of the American transportation system. To get the benefits of contrast, railway construction and equipment of today has been brought in juxtaposition with that which amazed our ancestors less than two generations ago.

The story of how 186 separate original companies have been finally consolidated into what is now the New York Central Railroad furnishes a concrete example of the evolution of American railways from the primitive rails, bridges and engines to the modern tracks, viaducts and monster engines shown in the illustrations.

A brief sketch of the life of the late James J. Hill, whose career was contemporaneous with railway extension into the far west, falls naturally into this historical section of the *Library*.

Then follow brief reviews of the railway situation in war-torn Europe, in its operative, financial and economic aspects. How the shortage of male railway labor is being pieced out by the employment of women in the heaviest sort of terminal work is shown by a series of photographic reproductions of lasses at work at the South Eastern & Chatham freight station at Bricklayers Arms.

This leads to a noteworthy discussion of the preparedness of our railways to handle "a state of war" in the United States, to which the editor would add the suggestion that the question of co-ordination of railway control in such an emergency has been solved in Great Britain without sacrificing any of the initiative and experience of private ownership.

The question of government regulation of the railways and the necessity for bringing them all under a single national authority is discussed from every angle. In this noteworthy series of papers it is not invidious to indicate that the subject has never been discussed in a more searching and statesmanlike manner than in Mr. Otto H. Kahn's paper on "The Government and the Railroads."

The two extracts from the classic chapters of Charles Francis Adams and Arthur Twining Hadley on traffic associations are

reprinted in response to numerous requests from schools and colleges for enlightenment on the subject of "Railway Pooling," interest in which is apparently reviving.

Timely articles on Federal Valuation, the unjust manipulation of Railway Mail Pay, the Waterways Movement, the regulation of railway wages and cognate topics make this volume one of living interest to students of our railway problems.

As in former issues, the concluding chapter of *The Railway Library* consists of the annual report of the Bureau of Railway News and Statistics in which is presented the latest information in regard to American and foreign railways, being the most comprehensive annual review of its kind in the United States.

For co-operation in the compilation of the *Library* acknowledgments are due to my associate, Francis A. Bonner.

SLASON THOMPSON.

Chicago, July, 1916.



SINGLE NATIONAL RAILWAY REGULATION

(Transportation plank adopted by the Republican National

Convention at Chicago, June 8, 1916.)

"Interstate and intrastate transportation have become so interwoven that the attempt to apply two and often several sets of laws to its regulation has produced conflicts of authority, embarrassment in operation and inconvenience and expense to the public.

"The entire transportation system of the country has become essentially national. We, therefore, favor such action by legislation or, if necessary, through an amendment to the Constitution of the United States, as will result in placing it under exclusive Federal control."

RESOLUTION OF THE NATIONAL ASSOCIATION OF MANUFACTURERS

"Whereas, National business, national development and national defense require the vigorous resumption of improvements, additions and extensions by our railways; and whereas, such resumption is obstructed by defects in the system of governmental regulation of railways; therefore, be it

"Resolved, That the National Association of Manufacturers urges Congress to exert its constitutional power of regulation over these instrumentalities of interstate commerce and thus unify regulation of railways to the exclusion of unfair intrastate jurisdiction where federal and state regulation conflict;

"Resolved, That we favor legislation which will simplify the functions of the Interstate Commerce Commission and strengthen its organization, to the end that that body may delegate special tasks and regional administration to competent auxiliaries;

"Resolved, That we urge Congress to enact as a provision of the interstate commerce law the rule that such rates shall be permitted as will yield the average road earnings sufficient to attract investment for the development of transportation facilities and for the opening up of regions not now served by railways."

RAILWAYS IN AMERICA IN 1837*

BY DAVID STEVENSON.

Within a very few years a wonderful change has been effected in land communication throughout Great Britain and America, where railways have been more extensively and successfully introduced than in any other parts of the world. As early as the sixteenth century, wooden tramroads were used in the neighborhood of many of the collieries of Great Britain. In the year 1767, cast-iron rails were introduced at Colebrookdale, in Shropshire. In 1811, malleable-iron rails were for the first time used in Cumberland; and the locomotive engine, on an improved construction, was successfully introduced on the Liverpool and Manchester line in 1830. Little progress has hitherto been made in the formation of railways on the continent of Europe. A small one has been in existence for some time in the neighborhood of Lyons, but the only railroad, constructed in France, for the conveyance of passengers by locomotive power, is that from Paris to St. Germain, which was opened only in 1837. In Bohemia, the Chevalier Gerstner, about eight years ago, constructed a railway of eighty miles in length, leading from the river Muldau to the Danube. In Belgium, the railway from Antwerp to Ghent has been in use for some time; and some lines are at present being constructed in Holland and Russia. But my present purpose is to describe the state of this wonderful improvement in communication, in the United States.

The Quincy Railroad in Massachusetts was the first constructed in America. It was intended for the conveyance of stone from the Quincy granite quarries to a shipping point on the river Neponset, a distance of about four miles. At the end of this chapter I have given a tabular list of the principal railroads which are already finished, and also of those that have been begun in the United States, which show the rapid increase of these works since 1827, the date at which the Quincy Railroad was completed. From these tables it appears that, in 1837, there were no fewer than fifty-seven railways completed and in full operation, whose aggregate length amounts to upwards of 1,600 miles; and also that thirty-three railways were then

*Being Chapter IX of Stevenson's "Civil Engineering of North America," London, 1838—a very rare book.

in progress, which, when completed, will amount to about 2,800 miles. In addition to this, upwards of one hundred and fifty railway companies have been incorporated; and the works of many of them will, in all probability, be very soon commenced.

The early American railroads consisted of iron rails and chairs resting on stone blocks, and were constructed on the same principles as those in this country. But the American engineers soon discovered that this construction of road, although it had been to a certain extent successfully applied in England, was not at all capable of withstanding the rigors of an American winter. The intense frost, with which the northern part of the country is visited, was found to split the stone blocks and to affect the ground in which they were embedded to such a degree that their positions were materially altered, and the rails were in many cases so much twisted and deranged as to be quite unfit for the passage of carriages. The consequence was, that most of the railroads constructed in the United States after the English system, had actually to be relaid at the close of every winter, and during the continuance of the frost only be traveled on at a decreased speed. The Americans have put numerous plans to the test of actual experiment, in their endeavors to form a structure for supporting rails, adapted to the climate and circumstances of the country. There are hardly two railways in the United States which are made exactly in the same way, and few of them are constructed throughout their whole extent on the same principles; but although great improvements have undoubtedly been effected, it is doubtful whether a structure proof against the detrimental effects of frost has yet been produced. An enumeration of the various schemes which have been proposed for the construction of railways in America would not be very useful, even if it were possible. I shall, therefore, only mention those constructions which came under my own observation, some of which are found to be very suitable.

The Boston and Lowell Railway in Massachusetts is twenty-six miles in length, and is laid with a double line of rails. The breadth between the rails, which is four feet eight and a half inches, is the same in all the American railroads, and the breadth between the tracks is six feet.

Fig. 1 is a transverse section, and Fig. 2 a side view of one of the tracks, in which *a* are granite blocks six feet in length, and about

Fig. 1.



Fig. 2.



Fig. 3.



eighteen inches square. These are placed transversely, at distances of three feet apart from center to center, each block giving support to both the rails. This construction, as formerly noticed by me in some communications made to the Society of Arts for Scotland,* was first introduced in the Dublin and Kingstown Railway, in Ireland, but was found to produce so rigid a road that great difficulty was experienced in securing the fixtures of the chairs. From the difficulty also of procuring a solid bed for stones of so great dimensions most of them, after being subjected for a short time to the traffic of the railway, were found to be split. The blocks on the Boston and Lowell Railway were affected in the same manner, and are besides found to be very troublesome during frost.

Fig. 3 is an enlarged view of the rail and chair used on this line. The rails are of the kind called fish-bellied. They weigh 40 pounds per lineal yard, and rest in cast-iron chairs, weighing 16 pounds each. The form of the rails and chairs resembles that at first used on the Liverpool and Manchester Railway.

* * * * *

Fig. 8.



Fig. 9.



Figs. 8 and 9 are a cross section and side view of the Saratoga and Schenectady Railway. The parallel trenches marked *a*, are eighteen inches square, and four feet eight and a half inches apart from center to center. They extend throughout the whole line of the railway, and are firmly punned full of broken stones. Longitudinal sleepers of wood, marked *b*, measuring eight by five inches, are placed on these trenches, which support the transverse wooden

*Transactions of the Society of Arts for Scotland, Edinburgh New Philosophical Journal for April, 1835 and April, 1836.

sleepers, marked *c*, measuring six inches square, and placed three feet apart from center to center. Longitudinal runners, marked *d*, measuring six inches square, are firmly spiked to the transverse sleepers, and the whole is surmounted by a plate-rail half an inch thick, and two and a half inches wide, weighing about 13 pounds per lineal yard.

The Newcastle and Frenchtown Railway, which is sixteen miles in length, and forms part of the route from Philadelphia to Baltimore, is constructed in the same way as that between Schenectady and Saratoga, excepting that the plate-rail is two and a half inches broad, and five-eighths of an inch thick, and weighs nearly 16 pounds per lineal yard. The Baltimore and Washington Railway is also constructed in the same way as regards the foundation and arrangement of the timbers, but edge-rails are employed on that line three and a half inches in breadth at the base, and two inches in height.

Fig. 10.

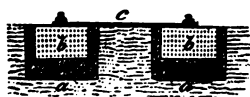


Fig. 11.



Several experiments have been made on the Columbia Railroad, in Pennsylvania, which is eighty-two miles in length, and is under the management of the state. Part of the road is constructed in accordance with Figs. 10 and 11, which are a transverse section and side view of one of the tracks. The trenches marked *a*, measuring two feet six inches in breadth, and two feet in depth, are excavated in the ground, and filled with broken metal; in these, the stone-blocks, *b*, two feet square, and a foot in thickness, are imbedded at distances of three feet apart, to which the chairs and rails are spiked in the ordinary manner. The rails on each side of the track are connected together by an iron bar, marked *c*, in Fig. 10. This attachment is rendered absolutely necessary on many parts of the Columbia Railroad by the sharpness of the curves, which, at the time when the work was laid out, were not considered so prejudicial on a railway as experience has shown them to be.

Another plan tried on this line is shown in Figs. 12 and 13, which are a transverse section and side view. In this arrangement a continuous line of toe curb, one foot square, marked *a*, resting on a

stratum of broken stone, is substituted for the isolated stone-blocks, shown in Figs. 10 and 11. A plate-rail, half an inch thick, and two

Fig. 12.*Fig. 13.*

and a half inches broad, is spiked down to treenails of oak, or locust wood, driven into jumper-holes bored in the stone curb.

The construction shown in Figs. 16 and 17, which are a cross section and side view of one of the tracks, is in very general use in America. I met with it on the Philadelphia and Norristown, the New York and Harlem, and the Buffalo and Niagara railroads; and I believe it has been introduced on many others. It consists of

Fig. 16.*Fig. 17.**Fig. 18.*

two lines of longitudinal wooden runners, marked *a*, measuring one foot in breadth, and from three to four inches in thickness, bedded on broken stone or gravel. On these runners, transverse sleepers, *b*, are placed, formed of round timber with bark left on, measuring about six inches in diameter, and squared at the ends, to give them a proper rest. Longitudinal sleepers, *c*, for supporting the rails, are notched into the transverse sleepers, as shown in the diagram. Fig. 18 is an enlarged view of the plate-rail and longitudinal sleeper used for railways of this construction. The rail is made of wrought-iron, and varies in weight from 10 to 15 pounds per lineal yard. It is fixed down to the sleepers at every fifteen or eighteen inches, by spikes four or five inches in length, the heads of which are counter-sunk in the rail.

Figs. 19 and 20 are the rails used on the Camden and Amboy Railway, which is sixty-one miles in length. They are parallel edge-rails, and are spiked to transverse sleepers of wood, and, in some places, to wood treenails driven into stone blocks. Their

breadth is three and a half inches at the base, and two and a half at the top, and their height is four inches. They are formed in lengths of fifteen feet, and secured at the joints by an iron plate on

Fig.19.

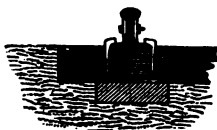
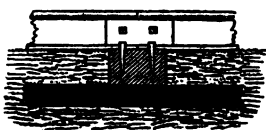


Fig.20.



each side, with two screw-bolts passing through the plates and rails, as shown in the diagram. On the Philadelphia and Reading Railroad, rails of the same form have been adopted.

Fig. 21.

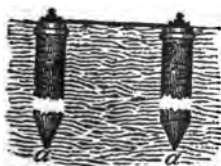
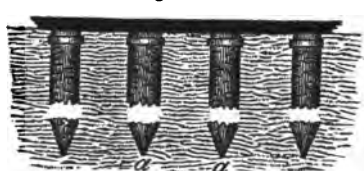


Fig. 22.



Figs. 21 and 22 show another construction, which I observed on several of the railroads. It was proposed with a view to counteract the effects of frost. Round piles of timber, marked *a*, about twelve inches in diameter, are driven into the ground as far as they will go, at the distance of three feet apart from center to center. The tops are cross-cut, and the rails are spiked to them in the same way as in the Camden and Amboy Railway, which is shown in Figs. 19 and 20. The heads of the piles are furnished with an iron strap, to prevent them from splitting; and the rails are connected together at every five feet by an iron bar.

Fig.26.

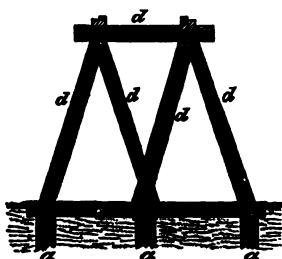
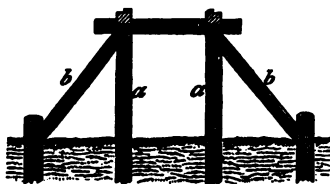


Fig. 27.



The railroad between Charleston and Augusta, and many others in the southern states, where there is a scarcity of materials for

forming embankments, are carried over low lying tracts of marshy ground, elevated on structures of wooden truss-work, such as is shown in Figs. 26 and 27. The framing in Fig. 27 is used in situations where the level of the rails does not require to be raised more than ten or twelve feet above the surface of the ground. Piles from ten to fifteen inches in diameter, marked *a*, are driven into the ground by a piling engine, and, in places where the soil is soft, their extremities are not pointed but are left square, which makes them less liable to sink under the pressure of the carriage. The struts marked *b* are attached to the tops of the piles, and are also fixed to dwarf piles driven into the ground. Their effect is to prevent lateral motion. Fig. 26 is a truss-work which is used for greater elevations, and is sometimes carried even to the height of fifteen or twenty feet. Piles marked *a* are driven into the ground, and connected by the transverse beam *c*. Above these the superstructure formed of the beams *d* is raised, and upon it the rails are placed. It is evident, however, that these structures are by no means suitable or safe for bearing the weight of locomotive engines or carriages, and, as may naturally be expected, very serious accidents have occasionally occurred on them. They are besides generally left quite exposed, and in some situations, when they are even so much as twenty feet high, no room is left for pedestrians, who, if overtaken by the engine, can save themselves only by making a leap to the ground.

These varieties of construction were all in use when I visited the United States in 1837, but the American engineers had not at that time come to any definite conclusion as to which of them constituted the best railway. It seemed to be generally admitted, however, that the wooden structures were more economical than those formed of stone, and were also less liable to be affected by the frost. Structures of wood also possess a great advantage over those of stone, from the much greater ease with which the rails supported by them are kept in repair. Wooden railroads are more elastic, and bend under great weights, while the rigid and unyielding nature of the railroads laid on stone blocks causes the impulses produced by the rapid motion of locomotive carriages, or heavily loaded wagons, over the surface, to be much more severely felt both by the machinery of the engine and by the rails themselves. Experience, both in this country and in America, has shown the truth of these remarks. On the Liverpool and Manchester Rail-

way, for example, on which a large sum is annually expended in keeping the rails in order, the part of the road which requires least repair is that extending over Chat Moss, where the rails are laid on wooden sleepers, and the weight of passing trains of loaded wagons produces a sensible undulation in the surface of the railway, which at this place actually floats on the moss. These considerations are worthy of attention; and, since the introduction of Kyan's patent anti dry-rot preparation, wood is beginning to be more generally employed for the construction of railways in this country. The rails of the Dublin and Kingstown road are now laid on wood, and it has also been extensively employed on the Great Western Railway now in progress.

The rails used in the United States are of British manufacture. They are often taken to America as ballast; and the government of the United States having removed the duty from iron imported for the purpose of forming railways, the rails are laid down on the quays of New York nearly at the same cost as in any of the ports of Great Britain. Those of the Brooklyn and Jamaica road, which are in lengths of fifteen feet, and weigh 39 lbs. per lineal yard, are of British manufacture, and cost at New York when they were landed in 1836, £8 per ton; the cast-iron chairs, which are also of British manufacture, weigh about 15 lbs. each, and cost £9 per ton. There is a great abundance of iron-ore in America, and some of the veins in the neighborhood of Pittsburgh are at present pretty extensively worked; but the Americans know that it would be bad economy to attempt to manufacture rails, so long as those made at Merthyr Tydvil Ironworks, in Wales, can be laid down at their sea-ports at the present small cost. In some of the iron-works which I visited, the workmen were rolling plate-rails, which is the only kind they ever attempt to make; but even these can be got, if not at less cost, at all events of much better quality, from Britain.

The stone blocks in use on some of the railways are made of granite, which, as already noticed, is found in several parts of the United States. Yellow pine is generally employed for the longitudinal sleepers, and cedar, locust, or white-oak, for the transverse sleepers on which the rails rest; cedar, however, if it can be obtained, is generally preferred for the transverse sleepers, because it is not liable to be split by the heat of the sun, and is less affected than perhaps any other timber by dampness and exposure to the atmosphere. The cedar sleepers used on the Brooklyn and Jamaica

Railway, measuring six inches by five, and seven feet in length, notched and in readiness to receive the rails, cost 2s. 3½d. each, laid down at Brooklyn. It is a costly timber, and is not very plentiful in the United States; it has also risen greatly in value since the introduction of railways, for the construction of which it is peculiarly applicable. For all treenails, locust-wood is universally employed.

The American railroads are much more cheaply constructed than those in this country, which is owing chiefly to three causes; *first*, they are exempted from the heavy expense often incurred in the construction of English railways, by the purchase of land and compensation for damages; *second*, the works are not executed in so substantial and costly a style; and, *third*, wood, which is the principal material used in their construction, is got at a very small cost. The first six miles of the Baltimore and Ohio Railroad, which is formed "in an expensive manner, on a very difficult route," has cost, on an average, about £12,000 per mile. The railroads in Pennsylvania cost about £5,000 per mile; the Albany and Schenectady Railroad upwards of £6,000 per mile; the Schenectady and Saratoga Railway £1,800 per mile; and the Charleston and Augusta Railroad about the same.* Mr. Moncure Robinson, in a report relative to the Philipsburg and Juniata Railroad, states that the first ten miles of the Danville and Pottsville Railroad, formed for a double track, but on which a single track only was laid, cost on an average £4,400 per mile, and that the Honesdale and Carbondale Railroad, 16 1-3 miles in length, laid with a single track, and executed for a considerable portion of its length on truss-work, is understood, with machinery, to have averaged £3,600 per mile. The average cost of these railways, constructed in different parts of the United States, is £4,942 per mile.

This contrasts strongly with the cost of the railways constructed in this country. The Liverpool and Manchester Railway cost £30,000 per mile; the Dublin and Kingstown £40,000, and the railway between Liverpool and London is expected to cost upwards of £25,000.

* * * * *

I found it rather difficult to obtain much satisfactory information regarding the expense of upholding the American railways.

*Facts and suggestions relative to the New York and Albany Railway. New York, 1833.

It is stated in a report made by the Directors of the Boston and Worcester Railroad that Mr. Fessenden, their engineer, to whom I am indebted for much kind attention and valuable information, estimates the annual expenditure for repairing the road, carriages, and engines, and providing fuel and necessary attendance for forty-three and a half miles of railway at £6,829 per annum, which is at the rate of £157 per mile. The expense of the repairs on the Utica and Schenectady Railroad, which is about seventy-seven miles in length, amounts to £28,000 per annum, being at the rate of about £363 per mile. These sums for keeping railways in repair are exceedingly small, compared with the amount expended in this country for the same purpose. On the Liverpool and Manchester Railway, for example, the expense annually incurred in keeping the engines in a working state and the railway in repair, amounts to upwards of £30,000 or £1,000 per mile. This difference in the cost arises in a great measure from the comparatively slow speed at which the engines working on the American railways are propelled, which, in the course of my own observation, never exceeded the average rate of fifteen miles per hour. On the State railways, and also on many of those under the management of incorporated companies, fifteen miles an hour is the rate of traveling fixed by the administration of the railway, and this speed is seldom exceeded.

On some of the American railways, where the line is short or the traffic small, horse power is employed, but locomotive engines for transporting goods and passengers are in much more general use. In New York, Brooklyn, Philadelphia, Baltimore, and other places which have lines of railway leading from them, the depot or station for the locomotive engines is generally placed at the outskirts, but the rails are continued through the streets to the heart of the town, and the carriages are dragged over this part of the line by horses, to avoid the inconvenience and danger attending the passage of locomotive engines through crowded thoroughfares. I traveled by horse power on the Mohawk and Hudson Railway, from Schenectady to Albany, a distance of sixteen miles, and the journey was performed in sixty-five minutes, being at the astonishing rate of fifteen miles an hour. The car by which I was conveyed carried twelve passengers, and was drawn by two horses which ran stages of five miles.

The first locomotive engines used in America were of British manufacture, but several very large workshops have lately been

established in the country for the construction of these machines, which are now manufactured in great numbers. The largest locomotive engine-works are those of Mr. Baldwin, Mr. Norris, Mr. Long, and Messrs. Grant and Eastrick, all in Philadelphia, and the Lowell Engine-work at Lowell. When I visited the work of Mr. Baldwin, to whom I am indebted for much attention and information, I found no less than twelve locomotive carriages in different states of progress, and all of substantial and good workmanship. Those parts of the engine, such as the cylinder, piston, valves, journals, and slides, in which good fitting and fine workmanship are indispensable to the efficient action of the machine, were very highly finished, but the external parts, such as the connecting rods, cranks, framing, and wheels, were left in a much coarser state than in engines of British manufacture. The American engines, with their boilers filled, weigh from twelve to fifteen tons, and cost about £1400 or £1500, including the tender. This is not much more than the cost of an engine of the same weight in this country. They have six wheels. These are arranged in the following manner, so as to allow the engine to travel on rails having a great curvature; the driving wheels, which are five feet in diameter, are placed in the posterior part of the engine close to the fire-box, and the fore part of the engine rests on a truck running on four wheels of about two feet in diameter; a series of friction-rollers, arranged in a circular form, is placed on the top of the truck, and in the center stands a vertical pivot which works in a socket in the framing of the engine. The whole weight of the cylinders and the fore part of the boiler rests on the friction rollers, and the truck turning on the pivot as a center, has freedom to describe a small arc of a circle; so that when the engine is not running upon a perfectly straight road, its wheels adapt themselves to the curvature of the rails, while the relative positions which the body of the engine, the connecting rods, and other parts of the machinery bear to each other, remain unaltered.*

*I believe an attempt was made to apply Avery's Rotatory Engine to propel a locomotive carriage, on one of the American railways, but I could not obtain satisfactory information either as to the particulars of the experiment, or the part of the country in which it was made. Avery's engines are, I believe, a good deal used in the northern parts of the United States, for driving small mills. They are generally of from 6 to 12 horse power. In New York I saw three of them at work, one in the Astor Hotel, which was employed to pump water, grind coffee, etc., one in a saw-mill in Attorney Street, and the third working a printing press; these were the only engines constructed on the rotatory principle, which I saw in actual use in the country.

From the unprotected state of most of the railways, which are seldom fenced, cattle often stray upon the line, and are run down by the engines, which are in some cases thrown off the rails by the concussion, producing very serious consequences. To obviate this, and render railway traveling more safe, an apparatus called a "guard" has been very generally introduced. * * * * The apparatus affords a complete protection to the wheels of the engine. I experienced the good effects of it upon one occasion on the Camden and Amboy Railway. The train in which I traveled, while moving with considerable rapidity, came in contact with a large wagon loaded with firewood, which was literally shivered to atoms by the concussion. The fragments of the broken wagon, and the wood with which it was loaded, were distributed on each side of the railway, but the guard prevented any part of them from falling before the engine wheels, and thus obviated what might in that case have proved a very serious accident. This apparatus might be introduced with much advantage on the railways in this country, on which accidents, attended with the loss of several lives, have happened from similar causes.

The fuel used on most of the railways is wood, but the sparks vomited out by the chimney are a source of constant annoyance to the passengers and occasionally set fire to the wooden bridges on the line and the houses in the neighborhood. Anthracite coal, as formerly noticed, has been tried, but the same difficulties which attend its use in steamboat furnaces are experienced to an equal extent in locomotive engines. Plate XII. is a drawing of a locomotive carriage used on the Baltimore and Washington Railway, constructed by Gillingham and Winans at Baltimore, which is adapted to the use of anthracite coal. It has vertical cylinders, with a vertical tubular boiler, and weighs about eight tons.

In situations where the summit level of a railway cannot be attained by an ascent sufficiently gentle for the employment of locomotive engines, or where the formation of such inclinations, though perfectly practicable, would be attended with an unreasonably large outlay, transit is generally effected by means of inclined planes, worked by stationary engines. This system has been introduced on the Portage Railway over the Alleghany Mountains in America, on a more extensive scale than in other parts of the world. The Portage, or Alleghany Railway, forms one of the links of the Great Pennsylvania canal and railroad communication from Philadelphia

to Pittsburgh—a work of so difficult and vast a nature, and so peculiar, both as regards its situation and details, that it cannot fail to be interesting to every engineer, and I shall, therefore, state at some length the facts which I have been able to collect regarding it.

This communication consists of four great divisions, the Columbia Railroad, the Eastern Division of the Pennsylvania Canal, the Portage or Alleghany Railroad, and the Western Division of the Pennsylvania Canal. These works form a continuous line of communication from Philadelphia on the Schuylkill to Pittsburgh on the Ohio, a distance of no less than 395 miles.

Commencing at Philadelphia, the first Division of this stupendous work is the Philadelphia and Columbia Railroad, which was opened in the year 1834. It is eighty-two miles in length, and was executed at a cost of about £666,025, being at the rate of £8,122 per mile. There are several viaducts of considerable extent on this railway, and two inclined planes worked by stationary engines. One of these inclined planes is at the Philadelphia end of the line. It rises at the rate of one in 14.6 for 2,714 feet. The other plane which is at Columbia rises at the rate of one in 21.2 for a distance of 1,914 feet, and overcomes an elevation of 90 feet. A very large sum is incurred in upholding the inclined plane, and surveys have lately been made with a view to avoid them. The cost of maintaining the stationary power, and superintendence of the Philadelphia inclined plane, is said to be about £8,000 per annum, and that of the Columbia plane about £3,498 per annum. Locomotive engines are used between the tops of the inclined planes. The steepest gradient on that part of the line is at the rate of one in 117; but the curves are numerous, and many of them very sharp, the minimum radius being so small as 350 feet. This line of railway was surveyed and laid out before the application of locomotive power to railway conveyance had attained its present advanced state—at a period when sharp curves and steep gradients were not considered so detrimental to the success of railways as experience has since shown them to be.

The passenger carriages on the Columbia Railroad are extremely large and commodious. They are seated for sixty passengers, and are made so high in the roof that the tallest person may stand upright in them without inconvenience. There is a passage

between the seats, extending from end to end, with a door at both extremities; and the coupling of the carriage is so arranged that the passengers may walk from end to end of a whole train without obstruction. In winter they are heated by stoves. The body of each of these carriages measures from fifty to sixty feet in length, and is supported on two four-wheeled trucks, furnished with friction-rollers, and moving on a vertical pivot, in the manner formerly alluded to in describing the construction of the locomotive engines. The flooring of the carriages is laid on longitudinal beams of wood, strengthened with suspension-rods of iron.

At the termination of the railway at Columbia, is the commencement of the Eastern Division of the Pennsylvania Canal, which extends to Hollidaysburg, a town situate at the foot of the Alleghany Mountains. This canal is rather more than 172 miles in length, and was executed at an expense of £918,829, being at the rate of £5,342 per mile. There are 33 aqueducts, and 111 locks on the line, and the whole height of lockage is 585.8 feet. A considerable part of this canal is slackwater navigation, formed by damming the streams of the Juniata and Susquehanna. The canal crosses the Susquehanna at its junction with the Juniata, at which point it attains a considerable breadth. A dam has been erected in the Susquehanna at this place, and the boats are dragged across the river by horses, which walk on a towpath attached to the outside of a wooden bridge, at a level of about thirty feet above the surface of the water. I regret that I passed through this part of the canal after sunset, and had only a very superficial view of the works at this place, which are of an extensive and curious nature.

Hollidaysburg is the western termination of the Eastern Division of the Pennsylvania Canal. The town stands at the base of the Alleghany Mountains, which extend in a southwesterly direction, from New Brunswick to the State of Alabama, a distance of upwards of 1,100 miles, presenting a formidable barrier to communication between the eastern and western parts of the United States. The breadth of the Alleghany range varies from a hundred to a hundred and fifty miles, but the peaks of the mountains do not attain a greater height than 4,000 feet above the medium level of the sea. They rise with a gentle slope, and are thickly wooded to their summits. "The Alleghany Mountains present what must be considered their scarp or steepest side to the east, where granite, gneiss, and other primitive rocks are seen. Upon

these repose first, a thin formation of transition rocks dipping to the westward, and next a series of secondary rocks, including a very extensive coal formation."* The National Road, which has already been noticed, was the first line of communication formed by the Americans over this range; and in the year 1831, an Act was passed for connecting the Eastern and Western Divisions of the Pennsylvania Canal by means of a railroad. This important and arduous work, which cost about £526,871, was commenced within the same year in which the Act for its construction was granted, and the first train passed over it on the 26th of November, 1833, but it was not till the year 1835, that both the tracks were completed, and the railway came into full operation.

The railway crosses the mountains by a pass called "Blair's Gap," where it attains its summit level, which is elevated 2,326 feet above the mean level of the Atlantic Ocean. Mr. Robinson surveyed a line of railway from Philipsburg to the river Juniata, which is intended to cross the Alleghany Mountains by the pass called "Emigh's Gap." The summit level of this line is stated, in a report by the directors, to be 292 feet lower than that of the Portage Railway.

The preliminary operation of clearing a track for the passage of the railway from a hundred to a hundred and fifty feet in breadth, through the thick pine forests with which the mountains are clad, was one in which no small difficulties were encountered. This operation, which is called grubbing, is little known in the practice of engineering in this country, and is estimated by the American engineers, in their various railway and canal reports, at from £40 to £80 per mile, according to the size and quantity of the timber to be removed; an estimate which, from the appearance of American forests, I should think must in many instances be much too low. The timber removed from the line of the Alleghany railway was chiefly spruce and hemlock pine of very large growth. I passed over the Alleghany Mountains on the 11th of May, at which time the trees were thickly covered with foliage, and formed a wall on each side of the railway, which completely intercepted the view of the surrounding country during the greater part of the journey. An extensive view was occasionally obtained from the tops of the inclined planes, when nothing but a dense black forest was visible, stretching in all directions as far as the eye could reach.

*Encyclopedia Brit., article America.

The line is laid with a double track, or four single lines of rails, and is twenty-five feet in breadth. For a considerable distance the railway is formed by sidecutting along steep sloping ground, composed of clay-slate, bituminous coal and clay, part of the breadth of the road being obtained by cutting into the hill, and part by raising embankments protected by retaining walls of masonry. The railway is consequently liable to be deluged, or even entirely swept away by mountain torrents, and the thorough drainage of its surface has been attended with great expense and difficulty. The retaining walls by which the embankments are supported, in some places are not less than a hundred feet in height; they are built of dry-stone masonry, and have a batter of about one-half to one, or six inches horizontal to twelve inches perpendicular.

* * * * *

The inclined planes are, however, the most remarkable works which occur on this line. The railway extends from Hollidaysburg on the eastern base, to Johnstown on the western base of the Alleghany Mountains, a distance of thirty-six miles; and the total rise and fall on the whole length of the line is 2571.19 feet. Of this height, 2007.02 feet are overcome by means of ten inclined planes, and 564.17 feet by the slight inclinations given to the parts of the railway which extend between these planes. The distance from Hollidaysburg to the summit-level is about ten miles, and the height is 1398.31 feet. The distance from Johnstown to the same point is about twenty-six miles, and the height 1172.88 feet. The height of the summit-level of the railway above the mean level of the Atlantic is 2,326 feet.

* * * * *

The machinery by which the inclined planes are worked consists of an endless rope passing round horizontal grooved wheels placed at the head and foot of the planes, which are furnished with a powerful brake for retarding the descent of the trains. The ropes were originally made $7\frac{1}{2}$ inches in circumference, but they have lately been increased to 8 inches, to prevent a tendency which they formerly had to slip in the grooved wheels, occasioned by their circumference being too small for the size of the groove or hollow in the wheel. Two stationary engines of twenty-five horses' power each are placed at the head of the inclined planes, one of which is in constant use in giving motion to the horizontal wheels round which the rope moves while the trains are passing the in-

clined planes. Two engines have been placed at each station, that the traffic of the railway may not be stopped should any accident occur to the machinery of that which is in operation; and they are used alternately for a week at a time. Water for supplying the boilers has been conveyed at a great expense to many of the stations in wooden pipes upwards of a mile in length.

The planes are laid with a double track of rails, and an ascending and descending train are always attached to the rope at the same time. Many experiments have been made to procure an efficient safety car to prevent the trains from running to the foot of the inclined plane, in the event of the fixtures by which they are attached to the endless rope giving way. Several of these safety cars are in use, and are found to be a great security. The trains are attached to the endless rope simply by two ropes of smaller size made fast to the couplings of the first and last wagons of the train, and to the endless rope by a hitch or knot, formed so as to prevent it from slipping.

Locomotive engines are used on the parts of the road between the inclined planes.

* * * * *

The traveling on this railway is very slow. The train by which I was conveyed left Hollidaysburg at nine in the morning, reached the summit at twelve, where it stopped an hour for dinner, and arrived at Johnstown at five in the evening, seven hours having been occupied in traveling thirty-six miles, being only at the rate of about five miles an hour. Much time is lost in ascending and descending the inclined planes, and an hour is generally spent for dinner at an inn on the summit, which is the only house unconnected with the works which is met with on the whole journey.

The fourth division of this grand work is the Western Division of the Pennsylvania Canal, which extends from the termination of the Portage Railway at Johnstown to Pittsburgh. It has 64 locks, 16 aqueducts, 64 culverts, 152 bridges, and a tunnel upwards of 1,000 feet in length. This canal traverses the valleys of the Conemaugh, Kiskiminetas, and Alleghany Rivers, measures 105 miles in length, and cost £560,000, being at the rate of £5,333 per mile.

The whole distance of the Pennsylvania Canal and railroad communication, extending from Philadelphia to Pittsburgh, is 395 miles. I traveled this distance in ninety-one hours, exclusively of

the time lost in stopping at Columbia, Harrisburg, and other places of interest on the route. The average rate of traveling was therefore 4.34 miles per hour. One hundred and eighteen miles of this extraordinary journey were performed on railroads, and the remaining 277 miles on canals. The charge made for each passenger conveyed the whole distance was £3, being at the rate of nearly 2d. [4c] per mile.

There is only one railway in the British dominions in North America. It extends from St. Johns on Lake Champlain to the village of La Prairie on the St. Lawrence, and was made by a company of private individuals, called the Champlain and St. Lawrence Railroad Company, who obtained their act of Parliament in 1832. The railway is sixteen miles in length, and consists of plate-rails laid on wooden sleepers. There are no works of importance connected with it, as the line passes through an extensive prairie of low lying level land very favorable for its construction. Two locomotive engines are used on the railway, one of which was made in England and the other in the United States.

TABLE OF THE PRINCIPAL RAILWAYS IN OPERATION IN THE UNITED STATES IN 1837.

Name	Course	When opened	Length in miles	Whole length in each state
MAINE				
Bangor and Orono.....	From Bangor to Orono.....	1836	10	10
MASSACHUSETTS				
Quincy.....	Quincy Quarries to Neponset River....	1827	4	
Boston and Lowell.....	Boston to Lowell.....	1835	26 $\frac{1}{2}$	
Boston and Providence.....	Boston to Providence.....	1835	41 $\frac{1}{2}$	
Dedham Branch.....	Boston and Providence Railroad to Dedham.....	1835	2	
Boston and Worcester.....	Boston to Worcester.....	1835	44	
Andover and Wilmington.....	Andover to the Boston and Lowell Railroad.....	1836	7 $\frac{3}{4}$	
Taunton Branch.....	Boston and Providence Railroad and Taunton.....	1836	11	
Andover and Haverhill.....	Andover to Haverhill.....	1837	10	
Providence and Stonington.....	Providence to Stonington.....	1837	47	192 $\frac{1}{4}$
Mohawk and Hudson.....	Between the Rivers Mohawk and Hudson.....	1832	16	
NEW YORK				
Saratoga and Schenectady.....	Saratoga to Schenectady.....	1832	22	
Rochester.....	Rochester to Carthage.....	1833	3	
Ithaca and Oswego.....	Ithaca to Oswego.....	1834	29	
Rensselaer and Saratoga.....	Troy to Ballston.....	1835	24 $\frac{1}{2}$	
Utica and Schenectady.....	Utica to Schenectady.....	1836	77	
Buffalo and Niagara.....	Buffalo to Niagara Falls.....	1837	21	
Haerlem.....	New York to Haerlem.....	1837	7	
Lockport and Niagara.....	Lockport to Niagara Falls.....	1837	24	
Brooklyn and Jamaica.....	Brooklyn to Jamaica.....	1837	12	235 $\frac{1}{4}$

TABLE OF THE PRINCIPAL RAILWAYS IN OPERATION IN THE UNITED STATES IN 1837—(Continued).

NEW JERSEY				
Camden and Amboy.....	Camden to Amboy.....	1832	61	
Paterson.....	Paterson to Jersey.....	1834	16½	
New Jersey.....	Jersey City to New Brunswick.....	1836	31	108½
PENNSYLVANIA				
Columbia.....	Philadelphia to Columbia.....		82	
Alleghany.....	Hollidaysburg to Johnstown, over the Alleghany Mountains.....		36	
Mauch Chunk.....	Mauch Chunk to the Coal Mines.....	1828	5	
Room Rum.....	Mauch Chunk to Coal Mines.....		5½	
Mount Carbon.....	Mount Carbon to Coal Mines.....	1830	7½	
Schuylkill Valley.....	Port Carbon to Tuscarora, with numerous branches.....		30	
Schuylkill.....			13	
Mill Creek.....	Port Carbon to Mill Creek.....		7	
Minehill and Schuylkill.....			20	
Pine Grove.....	Pine Grove to Coal Mines.....		4	
Little Schuylkill.....	Port Clinton to Tamaqua.....	1831	23	
Lackawaxen.....	Lackawaxen Canal to the River Lackawaxen.....		16½	
Westchester.....	Westchester to Columbia Railroad.....	1832	9	
Philadelphia and Trenton.....	Philadelphia to Trenton.....	1833	26½	
Philadelphia and Norristown.....	Philadelphia to Norristown.....	1837	19	
Central Railway.....	Pottsville to Danville.....		51½	355½
DELAWARE				
Newcastle and Frenchtown.....	Newcastle to Frenchtown.....	1832	16	16
Baltimore and Ohio.....	Completed to Harper's Ferry, with branches.....	1835	86	
Winchester.....	Harper's Ferry to Winchester.....		30	
Baltimore and Port Deposit.....	Baltimore to Port Deposit.....		34½	
Baltimore and Washington.....	Baltimore to Washington.....	1835	40	
Baltimore and Susquehanna.....	Baltimore to New York.....	1837	59½	249¾
VIRGINIA				
Chesterfield.....	Richmond to Chesterfield Coal Mines.....		13	
Petersburg and Roanoke.....	Petersburg to Blakely on the Roanoke.....		59	
Winchester and Potomac.....	Winchester to Harper's Ferry.....		30	
Portsmouth and Roanoke.....	Portsmouth to Weldon.....		77½	
Richmond, Fredericksburg and Potomac.....	Richmond to Fredericksburg.....		58	
Manchester.....	Richmond to Coal Mines.....		13	250½
SOUTH CAROLINA				
South Carolina Railroad.....	Charleston to Hamburg on the Savannah.....	1833	136	136
GEORGIA				
Alatamaba and Brunswick.....	Alatamaba to Brunswick.....		12	12
ALABAMA				
Tuscumbia and Decatur.....	Mussel-Shoals, Tennessee River.....		46	46
LOUISIANA				
Pontchartrain.....	New Orleans to Lake Pontchartrain.....	1831	5	
Carolton.....	New Orleans to Carolton.....		6	11
KENTUCKY				
Lexington and Ohio.....	Lexington to Frankfort.....		29	29
Total length in miles.....				1652¾

A PIONEER OHIO RAILROAD

CARROLLTON CENTENNIAL EDITION FREE PRESS-STANDARD.

The present Wheeling & Lake Erie Railroad had its origin in Carrollton, Ohio, and is the outgrowth of the primitive road organized in 1849 by John Arbuckle, Gen. Henry A. Stidger, Hon. Isaac Atkinson, John Riley, James M. Davis, John B. Moody and others, known as the Carroll County Railroad. Town and township bonds and private stock subscription to the amount of \$40,000 put the Carroll County Railroad in operation. The road extended from Carrollton to Oneida, a distance of ten miles, where it connected with the Sandy and Beaver Canal and the Sandy Valley branch of the Cleveland & Wellsville Railroad, now the Cleveland & Pittsburgh Division of the Pennsylvania Lines. The first steps toward organizing the road were taken in 1849, and on May 24, 1852, the first train was run into Carrollton. The road was a crude



FREIGHT TRAIN AND STATION, 1863.

—*Courtesy of J. W. Helfrich, Carrollton, Ohio.*

affair. The rails were wooden stringers, six inches thick, eight inches wide and in length ranging from eight to sixteen feet. Along the upper side of these was a line of strapiron half an inch thick and three inches wide, fastened down with spikes driven about five

feet apart. The Cleveland & Wellsville road at first operated the Carroll County road on shares, running from Bayard to Oneida, thence to Carrollton and return. Later, when the Cleveland & Wellsville branch along the Sandy Valley was completed, that road discontinued its arrangement with the Carroll County road, and the local company bought an engine in New York—an old one which had been built in England and brought to America for a pattern. This was in 1855. Prosperity, however, failed to follow this stroke of enterprise, and in 1859 the road was sold by the sheriff to John Ebersole, Henry A. Stidger, James Huston, James P. Cummings, Jacob Helfrich and James Cameron. This sale, however, did not include the locomotive, which was the personal property of the president of the road. The new company operated under the name of the Carrollton & Oneida Railroad. A small amount of rolling stock was purchased, and horsepower was resorted to. The road was operated in this way until 1866, when new blood was infused into the company, a charter taken out and the road repaired and



—Courtesy of J. W. Helfrich, Carrollton, Ohio.
THE FIRST NARROW GAUGE RAILROAD IN OHIO.

equipped with a locomotive built in Cleveland. The fare at this time between Carrollton and Oneida was 75 cents one way, but the business consisted largely of freight traffic. In 1873 proposals were made by the Ohio & Toledo Railroad Company to extend the track into the new coal fields, equip the road with "T" rails and put on first-class rolling stock, with the ultimate purpose of building on to Toledo or some other Lake Erie port, providing the new company were given the old roadbed as it stood and the people of Carrollton subscribed \$45,000 in stock. Public meetings were held and great enthusiasm prevailed, with the result that in 1874 the Carrollton & Oneida Company donated its track and right of way to the Ohio & Toledo Company, receiving no return therefor, so far as known, and the people subscribed \$32,000 in stock. After many tribulations and failure to collect much of the stock subscription, the Ohio & Toledo, of which Gen. E. R. Eckley, of Carrollton, became president, succeeded in getting a narrow-gauge track in operation between Carrollton and Minerva and extended it south into Dell Roy. In 1877 E. G. Livermore, a New York banker, invested in the road and put N. A. Smith in charge. Smith put the road in first-class condition, extended the tracks to Sherrodsville, and eventually succeeded, after a bitter contest, in ousting the Eckley interests from the management. Thus General Eckley, to whose efforts



—Courtesy of J. W. Helfrich, Carrollton, Ohio.
BEGINNING OF THE W. & L. E. R. R.

the people of Carrollton owed the fact that they at last had a real railroad, found himself out in the cold and out of pocket. Many lawsuits against the railroad followed, and on November 27, 1878, under an order of court, the road was sold to the highest bidder, the Cleveland Iron Company buying it in the interest of the Smith party, who extended the line to Canton under the name of the Youngstown & Cannotton Valley, which was afterward changed to the Connotton Valley. In 1879 the first telegraph line was strung along the road, and Will J. Baxter was installed as the first telegraph operator at the Carrollton station. In 1881 the road, now controlled by Boston capitalists, acquired pieces of track leading from Canton to Zanesville and set out building connecting links. In 1883 the main line was extended to Cleveland, and shortly afterward to Coshocton, and on June 25, 1885, the name was changed to Cleveland & Canton. All this time the road was a narrow-gauge, and on Sunday, November 18, 1888, all preparations having been made, the road was changed to standard gauge in one day. The road was extended to Zanesville in 1889, and the name again changed to the Cleveland, Canton & Southern. In 1899 the road became known as the Wheeling & Lake Erie.

THE GREAT TUNKHANNOCK VIADUCT



This viaduct, which is the largest in the world, was built in connection with the Lackawanna Railroad's new 39-mile Scranton-Binghamton cut-off. It is half a mile long and 240 feet high and consists of ten spans of 180 feet each and two spans of 100 feet each. Some of the foundations were carried down to a depth of 95 feet before reaching solid rock.

EVOLUTION OF THE NEW YORK CENTRAL, 1831-1915

By PRESIDENT A. H. SMITH.

The New York Central Railroad as now constituted represents 186 predecessor companies, and the final consolidation of these companies on December 23, 1914, created one of the greatest railroad organizations in the United States, and at the same time planted an important landmark in the history of railroad transportation.

Each of these constituent companies, large and small, passed through many vicissitudes of construction and financing; struggles with popular opinions and laws; until finally a great transportation machine was completed for the public good.

A brief sketch of this evolution of The New York Central Railroad, from its beginning to the present time, may be of interest to those who have been the students of the development, and especially to those who have participated in it for so many years with heart, mind and money.

EARLY DEVELOPMENT IN NEW YORK STATE.

The Mohawk & Hudson Railroad Company was chartered in 1826 to build a line from Albany to Schenectady, and the road was opened to the public on August 9, 1831. Inclined planes, up which stationary engines pulled the cars by ropes, raised the passengers one hundred and eighty-five feet at Albany and one hundred and fifty feet at Schenectady to the level of the new road. Between these planes extended the strap rails, a distance of sixteen miles, on which, if all circumstances were favorable, the little engine "De Witt Clinton," with its remodeled stage coaches, might attain a maximum speed of fifteen miles an hour. The whole train then had but a fraction of the weight of a modern locomotive alone, and this great difference is but typical of the growth that has taken place in railroading in these eighty odd years.

In the face of vigorous opposition from those who could see in it nothing of good, the road prospered; the De Witt Clinton was succeeded by other locomotives, larger coaches were provided, and by 1844 a new road had been completed which made it possible to abandon the inclined planes.

In 1826, five years before the Mohawk & Hudson Railroad began operations, the Erie Canal had been opened. The State had contributed large sums to its building and fostered its growing commerce in every possible way. Therefore, it does not seem so surprising that an application, made in 1831 for a charter to construct a railroad from Schenectady to Buffalo, was refused by the Legislature, as establishing a dangerous competitor to the canal. Even in 1836, when, in response to urgent demands of the public, a line from Schenectady to Utica was permitted, it was not allowed to carry anything but passengers and their ordinary baggage. In 1837, however, mails were added, and in 1844 con-



THE "DE WITT CLINTON" AND TRAIN, 1831.

sent was given to carry freight during the canal's closed season. Not until 1847 was this permission extended to cover the entire year, and then only upon condition that the railroad should pay to the State the same toll per mile for the freight carried as the canal would have earned had it transported the property.

This restriction was enforced on all lines within thirty miles of and competing with any canal in the State of New York, and was not removed until 1851.

A road was opened from Rochester to Batavia in 1837; one from Utica to Syracuse in 1839; one from Auburn to Rochester in 1841; one from Batavia to Buffalo in 1842; and the following year saw the closing of all gaps and the completion of a line from Albany through to Buffalo.


A FOND HOPE REALIZED.

These various roads were under separate names, ownerships and managements, but the hope expressed at the dinner which celebrated the opening of the first of them all, the Mohawk & Hudson, that one might "breakfast in Utica, dine in Rochester and sup with friends on the shore of Lake Erie," was now realized.

1843. RAIL-ROAD ROUTE 1843.

BETWEEN

Albany & Buffalo.



FARE REDUCED--ARRANGEMENT TO COMMENCE JULY 10 1843.

Those who pay through between Albany and Buffalo, - \$10. in the best cars,
do. do. do. & in accommodation cars,
 which have been re-arranged, cushioned and lighted.

Those who pay through between Albany & Rochester, \$8. in the best cars,
do. do. do. & 50 in accommodation cars.

THREE DAILY LINES.

Through in 25 hours.

GOING WEST.

	18 th Feb.	21 st Feb.	24 th Feb.
Leave Albany,	6 A.M.	1 P.M.	7 P.M.
Pass Schenectady,	7 A.M.	2 P.M.	8 P.M.
Pass Utica,	11 P.M.	6 P.M.	4 A.M.
Pass Syracuse,	2 P.M.	3 A.M.	8 A.M.
Pass Auburn,	7 P.M.	4 A.M.	10 A.M.
Pass Rochester,	3 A.M.	10 A.M.	4 P.M.
Arrive at Buffalo,	7 A.M.	3 P.M.	9 P.M.

GOING EAST.

	18 th Feb.	21 st Feb.	24 th Feb.
Leave Buffalo,	4 A.M.	9 A.M.	4 P.M.
Pass Rochester,	8 A.M.	3 P.M.	10 P.M.
Pass Auburn,	3 P.M.	9 P.M.	4 A.M.
Pass Syracuse,	2 P.M.	11 P.M.	6 A.M.
Pass Utica,	2 P.M.	4 A.M.	10 A.M.
Pass Schenectady,	2 A.M.	10 A.M.	7 P.M.
Arrive at Albany,	8 A.M.	11 A.M.	4 P.M.

EMIGRANTS WILL BE CARRIED ONLY BY SPECIAL CONTRACT.

Passengers will procure tickets at the offices at Albany, Buffalo or Rochester through, to be entitled to seats at the reduced rates.

Fare will be received at each of the above places to any other places named on the route.

A historian of these early days writes: "By the beginning of 1843 there was a rail route by which it was possible to travel from Albany to Buffalo in thirty hours without changing cars more than six times. There were no through tickets or no baggage

checks. A ride over each of the seven independent roads was a complete transaction in itself. When the passenger got to the end of the road, he hunted up his baggage, if he had any, had it chalked to the next stopping place, bargained with expressmen and hackmen for transfer to the station of the next road in line, bought a new ticket and took a fresh start. By 1850, the science of railroading had progressed so far that the traveler could purchase through tickets between Albany and Buffalo for \$9.75; though he could not obtain, at any price, any information upon which he could rely about the movement of trains."

In 1848, a schedule was made for through trains from the Hudson River to Buffalo in the unprecedented time of twenty-two hours. The railroad now known as the Boston & Albany having been previously opened, there was thus created a through line from the Atlantic Ocean to the Great Lakes, except for the ferry across the Hudson at Albany, which river was not bridged until 1866.

THE ORIGINAL NEW YORK CENTRAL RAILROAD.

Having a through line, it was generally agreed that it would be better to unite the various roads, so that they might be operated as one, under a single management. To this end, application was made to the State Government, and on the second of April, 1853, an act was passed sanctioning the arrangement. In May of the same year, an agreement was entered into by the ten companies concerned, looking toward their consolidation into one corporation under the name of the "New York Central Railroad." Directors of the new company were elected at Albany on the sixth day of July, 1853, and it began to operate the line with its own officers on the first of August following. Thus, sixty-two years ago, the name "New York Central" came into existence. First applied to those lines which ran through the middle of New York State, it now represents a network of tracks affording transportation to the most prosperous and densely populated section of our country.

THE HUDSON RIVER RAILROAD.

When the Mohawk & Hudson Railroad was opened, in 1831, steamboats between New York and Albany had been operated for twenty-four years. It was long believed impossible to excel in speed the palatial steamers which plied the Hudson; and the rate

of fare between the two cities of one dollar, which competition reduced at times to fifty cents, and occasionally to twenty-five, discouraged early attempts at railroad building. Then, too, the physical difficulties of constructing a line close along the rugged shore of the river were many and severe.

The Harlem Railroad Company also opposed the plan for a river road. The Harlem Railroad was planned so as to reach Albany from New York by a route far enough back from the Hudson River to avoid direct competition with the popular steamboats, and at the same time to furnish means of transportation during the closed season of navigation.

Applications for charters for railroads along the river shore were made from time to time, but the opposition was strong and all were refused until 1846, when the Legislature gave its consent, and in July, 1847, the Hudson River Railroad was opened from what is now West Thirty-second Street to Breakneck Hill, fifty-three miles from New York and near the present station called Storm King. In 1849 the road reached Poughkeepsie, and on the first of October, 1851, operations were extended to the town of East Albany.

WHEN HORSES DREW THE CARS.

Meanwhile a passenger station had been located at Chambers Street, from which point the cars were hauled by horses up to Thirtieth Street. The line thrived as the country became more thickly settled, and its freight business, as well as passenger, took on goodly proportions. In 1868 the road opened a large freight station opposite St. John's Church, where a park of the same name formerly existed, which was a favorite resort in those days for New Yorkers. That name the station still bears and, amid its now changed surroundings, it still presents to view the wonderful bronze frieze that depicts, on either side of the statue of Commodore Vanderbilt, the marvels of land and water transportation.

The operation of passenger trains down the west side of Manhattan Island continued nearly twenty-five years; for it was not until November 1, 1871, that the completion of the Spuyten Duyvil & Port Morris Railroad, which connected the Hudson River and the Harlem Railroads, permitted them to reach the new Grand Central Depot, then just dedicated to the public service.

An item of interest, indicating the prosperity of the Hudson River Railroad, is found in the fact that in 1866 it ordered from England six thousand tons of steel rails, which, it is believed, was the earliest introduction of such rails, in quantity, into the United States.

With the bridging of the Hudson River at Albany in 1866, there was a continuous rail line from New York to Buffalo, controlled by two separate companies. Consolidation of these followed as the natural and desirable next step, which was taken by an agreement dated September 15, 1869. The new company was called the New York Central & Hudson River Railroad.

THE LAKE SHORE & MICHIGAN SOUTHERN.

In the same year that the two roads connecting New York and Buffalo were consolidated, the Lake Shore & Michigan Southern Railway Company was formed by bringing together the three principal companies owning the roads between Buffalo and Chicago. The history of these roads, however, runs back to the early days of railroad promotion.

Once the railroad had demonstrated its practical value, the people west of the Alleghanies were as clamorous for their introduction as were their friends on the seaboard. The Territory of Michigan, with a population at that time of but 35,000, chartered the Erie & Kalamazoo in 1833. This road was laid with a thin iron ribbon on oak stringers, and was opened for traffic in 1837, the motive power at first being horses. This company is still in existence, but for years its property has formed a part of the Lake Shore System under a perpetual lease.

Another road was built by the State of Michigan from Monroe, on Lake Erie, to the interior and was opened for traffic as far as Hillsdale, sixty-seven miles, in 1843.

The story of railway construction in this territory is one of great financial difficulties, bankruptcies, contending factions and communities, and disastrous competition. In 1853 it was planned to change the gauge of a short section of road so that through trains might be run, but the innovation was so strongly resisted by the citizens of Erie that some of them resorted to mob violence, which came to be known as the "Erie War," and it was finally put down only by establishing martial law.

Out of a large number of incorporations and small roads there naturally evolved a trunk line connecting important traffic centers. This, with its feeders, became an important factor in the upbuilding of the country, and incidentally made a strong corporation which afforded better security to its owners and greater service to its patrons.

In May, 1852, the first train ran between Toledo and Chicago; in 1853 between Toledo and Cleveland, and in the following year between Cleveland and Buffalo.

To a Quaker named Nehemiah Allen is given credit for first proposing a railroad along the shore of Lake Erie. At that time "the idea of a railroad presuming to compete with the large, luxurious and swift steamers plying between Buffalo, Cleveland and Detroit seemed so preposterous that he was regarded as a crank. No move was made to build a road east of Cleveland until July 4, 1849, when books were opened for subscriptions for the stock of the Painesville, Ashtabula & Geneva Railroad, which was opened for traffic November 20, 1852. In spite of all predictions that a railroad could never compete with the lake, this road earned dividends. A small stock investment reluctantly made by the city of Cleveland formed the principal part of that city's famous sinking fund."

Having the advantages of a very superior location on what is practically a water-level route, and being a pioneer in a country which enjoyed a very rapid growth and great material prosperity, it is not strange that the Lake Shore Railroad prospered. In pursuance of a policy perhaps ultra-conservative, for many years that company provided for its improvements and growth wholly out of its earnings, with a result that it had a great reserve strength to carry it over hard times and to enable it to meet the fierce competition to which, in common with other roads, it was frequently subjected.

As soon as a through route had been established between Buffalo and Chicago, nothing was more natural than that the Lake Shore should ally itself with its strong neighbor to the east, with whom it might exchange the heavy traffic moving between the principal ports on the Atlantic seaboard and the Western gateways.

In 1873, Commodore Vanderbilt, who was then President of the New York Central & Hudson River Railroad Company, became President of the Lake Shore & Michigan Southern Railway Company, and from that time down to the recent consolidation the general policy controlling these two large properties has been the same.



THE "DE WITT CLINTON" ENGINE AND TENDER, WHICH WEIGHS 12,000 POUNDS, OR LESS THAN THE WEIGHT OF ONE PAIR OF WHEELS OF THE MODERN ENGINE SHOWN, WHICH WEIGHS 427,000 POUNDS.

THE NEW YORK CENTRAL OF TO-DAY.

On December 23, 1914, The New York Central & Hudson River Railroad Company, The Lake Shore & Michigan Southern Railway Company, and nine of their subsidiaries—having altogether about 5,600 miles of road and about 14,000 miles of single track, or about half the girdle of the globe—were consolidated into one company under the name of The New York Central Railroad Company. * * *

The enormous increase in facilities and earnings which have taken place between the dates of the first and latest consolidations may be seen from the following:

In 1853,		In 1914	
Ten Companies consolidated into the New York Central Railroad from Albany to Buffalo		Twelve Companies consolidated into the New York Central Railroad from New York to Chicago.	
307	Passenger Cars	3,608	
1,702	Freight Cars	143,414	
\$3,151,514	Passenger Earnings	\$62,273,848	
\$2,479,820	Freight Earnings	\$105,858,426	
563	Miles of Track Operated	14,537	
\$1,125,506	Dividends	\$12,127,525	

In the thirteen years ending December 31, 1913, the gross revenues of the roads now making up the New York Central Railroad doubled, and the growth has been steady as well as large.

A comparison between 1914 and prior years should only be made with the fact in mind that the industrial depression of 1914 brought about a condition which made it impossible to utilize the plant of the company in any degree corresponding to its normal capacity. The results also indicate the effect upon the revenues of other factors which have combined to deplete the net earnings of all roads in the country during the past few years. The most important of these is the general rise in prices which has, in turn, brought about demands for higher wages, the awarding of which, frequently by arbitration boards, it was not possible to offset by any adequate change in the rates of transportation. The results are reflected in increases on what is now The New York Central Railroad since 1910 of \$14,594,343, or 21 per cent in wages as compared with an increase of less than 14 per cent in revenues.

RESULTS OF EFFICIENCY IN OPERATION.

In the year 1914 the revenues of the New York Central were reduced by \$18,000,000, but this enormous loss was met in part by retrenchment in operating expenses to the extent of \$15,500,000, of which \$6,000,000 was in the direct cost of transportation. Drastic measures were necessary to effect this economy; many employes had to be laid off in all departments; the program of improvements was largely postponed, and the expenditure of every dollar for the purchase of supplies was scrutinized.

In periods of declining business, it is very difficult to reconcile the public mind to a reduction in service corresponding to the loss in business. Necessarily, the big machine must be slowed up gradually, and everything that reasonably could be done was accomplished, except that sacrifices were not permitted where questions of safety in operation were involved.

Operating efficiency is by no means a thing of recent development. For years the management has been constant in its labors to promote it. Improved methods in shops, yards, round houses, offices, everywhere, in short, that there was an opportunity for them; improvements in appliances that would enable better results to be had with a lesser effort; improved methods of firing engines,

making for economy in the use of coal; improvements in engine construction, for the same purpose; the strictest economy in the use of supplies; these are some of the many ways by which the ratio of transportation expenses to gross earnings was kept at the same figure in 1914 as in 1906.

The New York Central has, in round numbers, 3,700 locomotives and 147,000 cars, which, coupled together, would reach from New York to Chicago and considerably beyond. To maintain this enormous amount of equipment in high-class condition requires an army of over 15,000 men, with five large locomotive shops, five large car shops, 30 district car shops and 75 engine terminal shops, involving an annual outlay in wages of \$20,000,000 and in material of about \$15,000,000. * * *

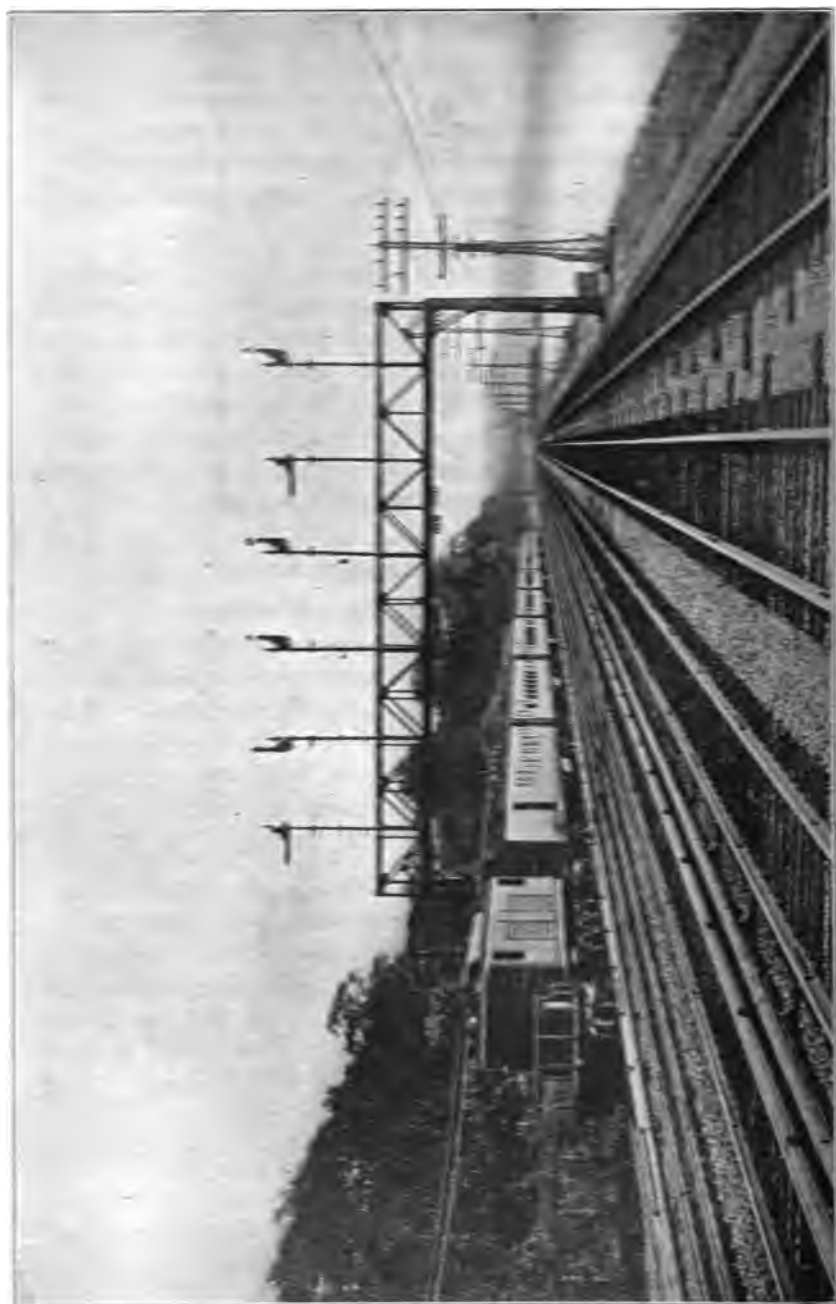
CONSTANT OUTLAYS REQUIRED.

Standards of physical condition upon railroads have been raised rapidly in recent years, partly in response to public opinion, but also because of the efforts of the management to increase the capacity of the road in advance of actual traffic needs. Every expenditure for the elimination of grades or curves, or for better station facilities, or for improved devices upon tracks or equipment, means in the end an ability to handle the traffic with less friction and with greater dispatch, thus increasing the capacity for handling new business.

Almost the only class of improvements in the railway "plant" in which the general public takes direct interest, or in which it is able to appreciate the tangible results gained, is in the erection of new passenger stations. For this reason, the building of the Grand Central Terminal in New York City is regarded as perhaps the greatest public triumph of the New York Central. Other splendid stations have been erected recently, notably the one at Utica, costing, together with yard improvements, some \$4,500,000, and that at Rochester, costing \$2,500,000.

But the public should not forget that other improvements and betterments are constantly being carried on at huge cost, though many of them are hidden from the public eye. * * *

Summed up, over \$78,000,000 have been put into physical improvements, the most of it in the four years prior to 1914. All



The "Twentieth Century Limited" on Electric Division Near Riverdale.

this work has been of the most enduring character. It has been done in the best manner known to the art of modern railroad construction. Into it have been placed the best materials obtainable, evolved from processes which are the results of thorough and scientific investigations.

Therefore, when it is stated that since January 1, 1900, the New York Central & Hudson River Railroad and the subsidiaries now consolidated with it, have expended in additions, betterments, new construction and new equipment, the enormous sums of \$400,000,000, it should also be emphasized that this money was expended in the most careful manner and in ways calculated to produce the best possible results from the investment.

The electric installation is now complete from New York to Harmon, on the Hudson River, and to North White Plains, on the Harlem line. The service has been extended to a considerable distance beyond the limit prescribed in the Act of the Legislature requiring that electric operation be installed through Park Avenue. Whether this has resulted in any substantial increase in commuting traffic beyond its normal growth is questionable. Owing to the present great cost of equipping railroads for electric operation and of operating them, it has been deemed inadvisable to extend the electrification beyond the restricted area included in the electric zone. * * *

THE PASSENGER SERVICE.

The consolidated New York Central Railroad is the greatest passenger-carrying road in the United States. It is difficult for the mind to grasp the full meaning of the statement that in the year 1914 the three lines now forming the chief constituents of the united roads transported 62,161,954 passengers, or a number greater than three-fifths of the population of this country. The distance traveled would have been equal to the carrying of 2,520,439,275 passengers one mile, a figure staggering to the imagination.¹

And, notwithstanding this great volume of travel, its trains are operated with a seldom failing regularity of schedule, and what is more important, with a high degree of safety. In the four years ending with December 31, 1914, not a single passenger fatality

¹ In 1914 the Pennsylvania lines east and west carried 93,118,545 passengers, 2,480,951,952 passenger miles.

occurred in a train accident on the lines now composing the new organization, though they carried in that period passengers numbering more than twice the entire population of the United States.

A well-known illustration of its passenger service is afforded in the Empire State Express, the first high-speed passenger train of the United States, now in its 25th year of operation on the New York Central Railroad, with a record of over 6,000,000 miles run and 8,000,000 passengers carried safely to destination.

During these 25 years of railroad evolution the weight of this train has increased 200 per cent, due to the demands for steel equipment. It is now hauled by a powerful modern Pacific type locomotive having a weight 200 per cent greater than that of the famous old No. 999 which hauled the Empire State Express during the early days of its history and which attained such an enviable reputation throughout the country.

The cost of the train has advanced 300 per cent; the wages of employes have increased 45 per cent; the number of passengers handled per train has increased only 75 per cent, and the revenue earned per passenger-mile has remained stationary.

Since the inauguration of this world-famous train, which has come to be looked upon as a New York State institution, millions of dollars have been expended for modern signals, heavier rails and bridges, and for many other track and equipment appurtenances necessary to make such evolution possible.

This train is an illustration of the additional cost of railroad operation made necessary by the demands of modern travel, and it emphasizes the necessity for appreciation by the public of the need of the railroads for consideration and legislation which will make the continuation of such service possible. * * *

GOVERNMENTAL REGULATIONS.

Attention has been called to the fact that new standards of operation have followed the country's development, and in no less degree have other requirements been imposed upon the Company by the process of legislation. The cost of many of these will, no doubt, be absorbed in time, but the immediate effect has been to reduce net earnings. With the increasing cost of government, the railroads have been called upon to pay higher taxes, the amount of which has grown out of all proportion to property or

revenues. Unfortunately, other burdens have also been imposed upon the Company by governmental agencies which add nothing to safety, comfort or convenience of operation, and contribute nothing to the support of government. However, there is some evidence of a better understanding of these problems on the part of the public, and it is hoped that the reaction which appears to be setting in will correct some of the abuses that have grown up under the guise of public regulation.

GRAND CENTRAL TERMINAL.

A story of the New York Central would be incomplete without at least a brief description of the Grand Central Terminal. * * * In a technical sense, the Grand Central Terminal is not located upon the line of the New York Central Railroad, but it occupies (and extends far beyond) the site of the Old Grand Central Depot, the first up-town depot of the Harlem Railroad.

That company was incorporated in 1831, and the next year a short portion of the road was opened for business. Its terminus was first at Centre Street, near City Hall. By 1837, it was in operation to Fordham, then in Westchester County, a distance of twelve and one-half miles, and was, as an early account quaintly specifies, "traversed for nearly three-fourths of its length by steam power." Horses hauled the carriages from the City Hall to a station located near the present site of Madison Square Garden.

One of the wonders of this railroad was the tunnel, which, one authority tells us, "extends along the Fourth Avenue from 91st to 94th streets," and which, "among the thousands who are almost daily conveyed through it, a vast majority is impelled by a desire to examine."

In 1857 the Centre Street station was abandoned, and in 1869 the first Grand Central Depot was commenced. Commodore Vanderbilt selected the site and gave the station its name. The wood which fed the locomotives of those days was cut in an open lot adjoining the site of the present Hotel Belmont, the saw being run by a treadmill operated by horses, whose efforts to clamber up the never-ending incline were inspired, it is said, by wisps of hay suspended from poles just out of reach of their noses.

The new station, then well uptown, was an attraction that called visitors from far and near. It had fifteen tracks, and eighty-

three trains, three of them through expresses to and from the West, arrived and departed every day. During its opening year four million people passed through its doors.

Before thirty years had elapsed, the Grand Central Depot, which had been thought an enormous structure at its opening, was far too small, and in 1900 it was considerably enlarged. But these additional facilities failed to provide for the rapid increase in travel. It was now felt that provision must be made for many years of expected growth and plans were begun accordingly.

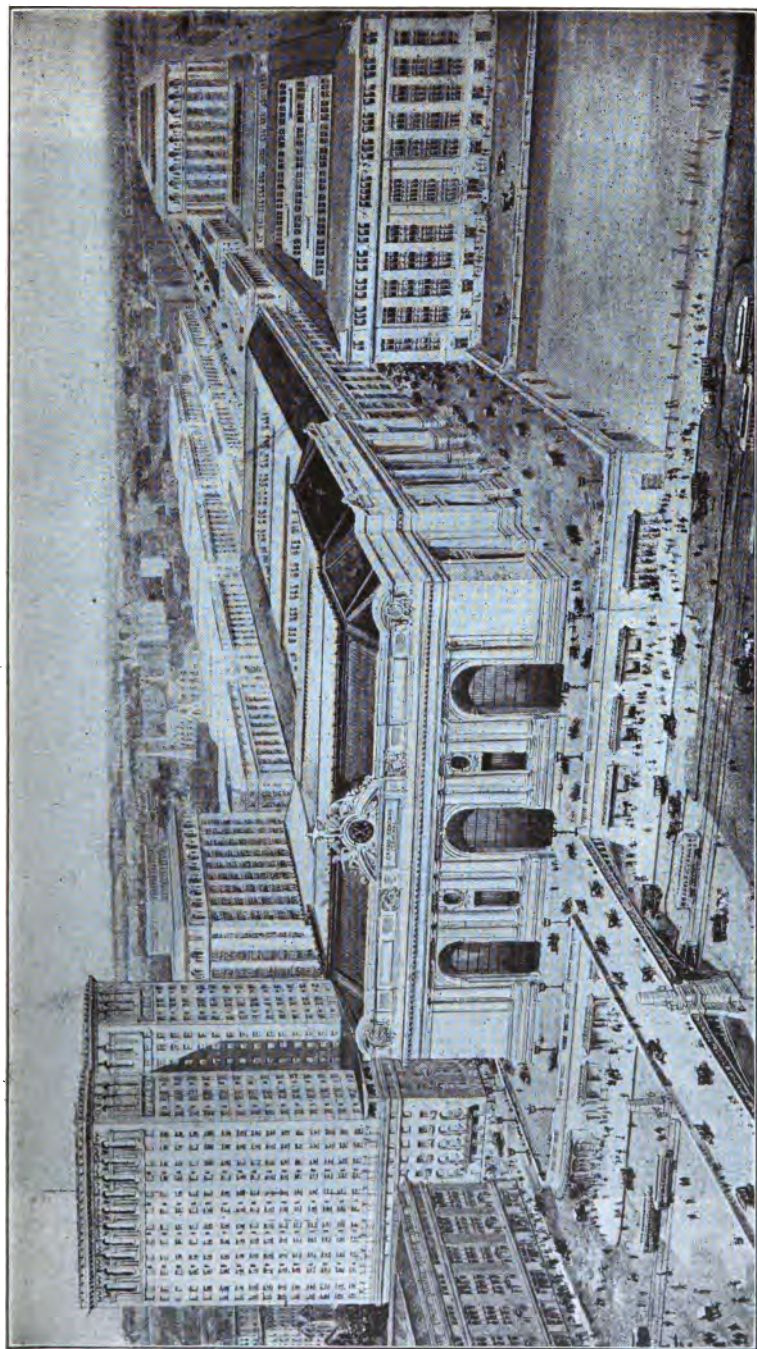
In 1902 came the mandate of the Legislature requiring electrical operation through Park Avenue tunnel. This requirement proved the key-note of the harmonious symphony of this splendid work. Without steam or smoke every track might be covered, if need be, and upper and lower levels could be provided, allowing the separation of through and suburban travel.

Thus it was determined to build for the future, and early in 1904 the actual work was commenced, continuing year after year, slowly but none the less surely. On February 1, 1913, though the project was not fully completed, its utility and magnificence were for the first time disclosed to an appreciative public.¹ * * *

* * * * *

In order to develop the transportation facilities between the great centers of population, the railroads have had to acquire, by lease or purchase, branch lines known as feeders. They have also had to gain through routes on which, by means of one common organization, the service might be standardized and the greatest economies effected. This movement has sometimes been viewed with distrust, sometimes actively opposed. But a large part of the public to-day realizes that transportation, more than any other industry, must be conducted on a large scale in order to gain the greatest economies. Not only does the public at large gain by the extension of uniform methods of operation over a large area, but hundreds of small communities enjoy the advantages of a high-grade service which an independent local road could not afford to give.

¹ A description of the Grand Central Terminal appeared in the *Railway Library* for 1912.



Bird's Eye View of the New Grand Central Terminal, Park Avenue and 42d Street, New York City.



JAMES J. HILL.

THE CAREER OF JAMES J. HILL

(SEPT. 16, 1838—MAY 29, 1916)

(FROM THE NEW YORK TIMES, MAY 30, 1916)

Leaving as a monument of his life's work more than 6,000 miles of railroad, with gross earnings of \$66,000,000 from carrying 15,000,000 tons of freight annually, along whose line in six different States of the great Northwest are scattered 400,000 farms, with 65,000,000 acres of improved land worth \$5,000,000,000, James Jerome Hill was called the greatest empire builder of the new world.

Born near Guelph, in Wellington County, Ontario, Canada, he was the son of an Irish-Canadian, who went there in 1826 and became a successful farmer. His mother was Scottish, and Mr. Hill inherited the best traits of both races. His early education was obtained in the Rockwood Academy, a Quaker school, which he attended until his fifteenth year, when his father died.

It was three years later that the boy made his first vital decision to emigrate to the United States. In memory of this there still stands a stump at his old home, on which is rudely cut, "The last tree chopped by James J. Hill." His resolution to leave his home for pastures new was brought about by one of those chance incidents that mold the lives of great men. According to the story, a way-worn traveler stopped at the Hill farm for dinner, leaving his horse tied at the gate. The boy saw that the animal was tired and carried it a pail of water. The stranger was pleased at his thoughtfulness, and as he rode off tossed him a newspaper from the United States and called out gravely, "Go there, young man. That country needs youngsters of your spirit."

Young Hill read the paper carefully and found that it contained glowing accounts of the opportunities in the States. He decided to investigate for himself, and with that decision Canada lost one who might have proved to be her most useful citizen. The next morning he chopped that famous last tree.

GETS WORK ON RIVER FRONT.

Then he started on his travels, which led from Maine to Minnesota, during which he was always investigating and observing—

always looking for the chance that he felt would come to him. It was in 1856 that he disembarked from a Mississippi River packet at St. Paul, then a frontier town of about 5,000 inhabitants. After looking the town over, young Hill decided to go to work and obtained a job as stevedore and clerk with W. J. Bass & Co., agents for the Dubuque & St. Paul Packet Company. True to the instinct that was to make him great, he began to study river transportation and during the next fifteen years became a master of its problems. With knowledge came the realization of the needs of the great Northwest, and in 1865 Mr. Hill took the agency of the Northwest Packet Company, later becoming representative for the St. Paul and Pacific Railroad.

In 1869 Mr. Hill started in business for himself, when he organized the firm of Hill, Griggs & Co., in the transportation and fuel trade, and brought to St. Paul the first coal ever seen there. Two years later, after learning first hand of the fertile Red River Valley and seeing that adequate transportation was its crying need, he obtained a flat-bottomed steamer and established the first regular communication between St. Paul and the Manitoba ports along the river.

St. Paul was then having its first experience with railroad building and was meeting with poor success. Eighty miles of road had been laid to St. Cloud, 316 miles to Breckenridge. In addition, there were 100 miles built into space which were said to begin and end nowhere. This railroad venture finally collapsed with a debt of \$33,000,000, its only assets being "a few streaks of rust and a right of way." In addition it had earned the ill-will of all those connected with it.

Close to the land and knowing its promise, Mr. Hill felt that there were great things in store for the property. He felt a consuming desire to acquire it. Success had been the result of his hard work and foresight so far, and he began to make definite plans for getting hold of those dead railroads. For five years he dickered, those who knew his hopes regarding him as a visionary, and then he made the final decision and acted. He sold all his other interests, receiving \$100,000 for them, and, in partnership with Donald A. Smith, afterward Lord Strathcona; George Stephen, afterward Lord Mountstephen, and John S. Kennedy, the New York banker, obtained the property he desired.

BECOMES RAILROAD MANAGER.

This was the birth of the St. Paul, Minnesota & Manitoba Railway, which was formed to operate the property, with Mr. Hill as General Manager and chief of practically all operations. This was in 1878, and four years later he became Vice President, being elected President the following year. As chief executive he held the power to realize his dreams of a great transportation system, and he undertook to extend the road to the Pacific Ocean. Again the skeptics regarded his plans as impossible of successful completion, and the extension became known as "Hill's Folly." It was thought that it would be utterly impractical for his system to live in the face of the competition it was forced to meet. There were three great systems to the South, all of which received large Government bonuses, whereas the "Manitoba," or the "Great Northern," as it soon came to be known, did not have a dollar of Government subsidy or the grant of an acre of land to help it in its progress from the Minnesota boundary to the sea. Those who considered these facts failed to remember that the line had "Jim" Hill, as he was known, back of it. With his indomitable energy and grim determination the Great Northern had more behind it than all the Government land grants and subsidies the other roads had leaned on.

Critics said that he was building through a country barren of people, which could give his line no tonnage and would mean ruin. But they reckoned without the genius of the empire builder. He laid rails westward at the rate of a mile a day, and at an average cost of \$30,000 a mile, and as he went he left a trail of embryonic farms and homesteads by the railside. Thus was the foundation laid for the coming empire.

Then came the completion of the line to Puget Sound, and the empire builder turned his genius to building up the land that must support his road. Knowing that there was quick money in beef and hogs, he introduced the live-stock industry into vast areas of bunch-grass plains and improved the breeds of stock by importing the best blood that money could buy. He turned to farming and sent demonstration trains through the country with experts who showed the people how to grow more wheat to the acre, and then to market this grain, he made a cheap rate by railroad and steamship to Buffalo, where it was handled in the great elevators he built.

For twenty years Mr. Hill left nothing undone to develop his empire and to make it bring tonnage to "Hill's Folly," the Great Northern. During these years he came to be regarded as a sort of father by his people. They came and took up the land and thriving towns grew up almost before the weeds had grown on the railroad cuts and embankments. All through four States the name of Hill swayed the destinies of men, and there seemed to be nothing that could happen unless he was directly or indirectly responsible for its successful conclusion. The term "Hill's Folly" gradually changed to "Hill's Fortune"—his courage, foresight and will power had won.

With his fast-growing empire behind him he stood at the Pacific tidewater, and the Orient beckoned to him. He saw the golden opportunities that awaited him there, and he organized a fleet of Pacific steamships for the commercial invasion of China and Japan. Japan, then in the first flush of her recent growth, wanted steel rails, but proposed getting them from England, as the rates were less. It is said that John W. Gates, the Chicago steel magnate, came to Mr. Hill with the proposition of getting American rails to China, and the railroad man replied: "I will make you a rate of \$8 a ton from Chicago or Pittsburgh to Yokohama. If that is too much, I will carry it for the axle grease used on the locomotives and freight cars; if you can't stand that, I will carry your freight for nothing!"

NORTHERN PACIFIC "CORNER."

Mr. Hill's great passion for empire building conflicted with another great passion for railroad domain, and there ensued the great stock market fight for the control of the Northern Pacific, with its memorable "Blue Thursday," May 9, 1901, the story of which is still told in Wall Street. E. H. Harriman and his associates had then developed the Union Pacific system and had formed a close alliance with the Chicago, Milwaukee & St. Paul. Mr. Hill's roads lacked a Chicago outlet. Together with the late J. P. Morgan, Mr. Hill first endeavored to secure the St. Paul. That road was not for sale. They then bought control of the Burlington and turned it over to the Great Northern and Northern Pacific. Mr. Harriman and Jacob H. Schiff met this move by starting after the Northern Pacific in the open market, and so well conducted their campaign that they had all but control of the property before the Hill-Morgan crowd learned of the fight against them.

Mr. Morgan, who was abroad, cabled orders to buy all the Northern Pacific to be found in the market. The Harriman party was no less eager. Brokers acting for both sides bid the stock up until on the day of the corner it sold at \$1,000 a share, while panic seized the Stock Exchange and the rest of the market broke widely, sweeping away an estimated \$1,000,000,000 of market values. If all of the Northern Pacific stock that had been contracted for on the Exchange could have been delivered, it turned out, each party would have had a majority. But delivery was impossible, and a compromise was reached in which shorts were permitted to settle.

Following the settlement of the struggle in the stock market, the count of stock showed the Harriman party in possession of the majority of Northern Pacific common and preferred combined. But Mr. Hill and his associates had a majority of the common, and, being in control of the company, were in a position, under its charter, to retire the preferred stock. Thus the upshot was not far from a drawn battle, and there was evolved, by way of peace terms, the Northern Securities Company, to which were turned over the Great Northern and Northern Pacific, carrying the control of the Burlington, held by both parties. The United States Supreme Court subsequently dissolved the holding company, but in so doing ordered its shares distributed *pro rata*, much to Mr. Harriman's disappointment, and the control of the three roads reverted to Mr. Hill and his associates.

The best pen picture of "Jim" Hill is that written during the days of the Northern Pacific "corner." He was always a Westerner and in times of stress was at his best.

After the smash—when more than \$1,000,000,000 had been swept away, precipitating one of the worst panics known in the history of finance—James J. Hill, the storm centre of it all, stood grim, unshaken, and impregnable. He was aptly described by one of those who called on him at his hotel here.

"Somewhat below the average height," he said, "but built like a buffalo, with a prodigious chest and neck and head; his arms long, sinewy, powerful; his feet large and firm planted and legs as solid as steel columns—truly a massive, imposing figure of a man. And the head — shaggy brows, shading an eye that bored right through; a mass of long, iron-gray hair reaching to the collar of

his coat; and a heavy, rough, iron-gray beard, growing without restraint over the entire face, yet hiding nothing of the immense chin and powerful jaws, and the wide lips, between which showed two rows of teeth seemingly fit to crunch iron.

"A very pile-driver of a man, slow and deliberate to rise, but swift and crushing in the downward stroke. A man to avoid as an enemy, a joy as a friend. On this night, the whole financial structure of the country lying about him in ruins, Hill's eye was veiled with the light of combat. The skin showing at the temples was pale with the strain, the great hands clenched and opened and clenched again. His voice was harsh and his speech tense with suppression."

In times such as these Mr. Hill was as resourceful and dominant as the late J. Pierpont Morgan. Like him, he was brusque and willful—his enemies called him overbearing.

Mr. Hill was interested in many other properties in addition to his railroads and steamship lines, and is said to have bought into the famous Mesaba iron range at exactly the right time. So huge were his interests there that he testified before the Stanley Steel Committee in 1912 he would receive \$750,000,000 in ore from properties which he acquired for \$4,050,000.

In April, 1907, he retired as President of the Great Northern, and became Chairman of the Board of Directors, from which he resigned in June, 1912, retaining only his membership in the Executive Committee of the Board. His son, Louis W. Hill, succeeded him both as President and Chairman.

For more than a score of years Mr. Hill was a national figure, and in September, 1915, came here from his home in St. Paul on the urgent request of the group of bankers who made the \$500,000,000 loan to the Allies, and spent some time in consultation with them over the transaction. He said that it would prove to be a help to this country, but expressed regret that his presence here forced him to forego his birthday celebration at home.

The story of Mr. Hill's marriage is one that was often told as an example of romance. When he was a station agent near St. Paul he boarded at the Merchants' Hotel, where Mary Mehegan served his meals to him. He lost his heart to her and won her promise that she would marry him. Then he sent her away to

school, where he paid for her education, and when she returned some years later they were married. Their home life was said to be most happy, and they were never more joyful than when surrounded by their three sons and six daughters in the St. Paul home.

Mr. Hill always insisted that there was no secret in his great success. He had no new receipts for success to offer, and said: "The man with the big opportunity today is the man in the ranks." Extravagance, he insisted, was often the cause of failure. Mr. Hill regarded this as a national tendency, against which he strongly set himself, particularly when it concerns the natural resources of the United States.

During his active supervision of the Great Northern system, Mr. Hill oversaw every detail, often to the wonder and despair of the employes with whom he often came in contact.

His fame in his own country, the Northwest, and among his own people, those with whom he peopled his "empire," is attested by the fact that there are said to be at least ten thousand stories afloat in the Swedish sections, and all having him for their hero. He ruled his road and people almost like a dictator. The route of the road and the locations of its settlements, were all decided by him, whether others liked it or not, as part of his economic policy. Branch lines of his road were built with singular regularity, always providing a minimum of short lines on which light trains were necessary.

The principal tenets of his railway gospel were low grades, heavy power, large capacity cars, big trainloads on main lines, and he began to preach these things at the time when the best railway men thought them mere visions.

HIS INTEREST IN ART.

It was said that Mr. Hill was gifted with fine tastes and a keen artistic sense of beauty of form and color, and his collections of art and jewels were among the finest in the country. From the earliest days of his prosperity he spent money in indulging what might be called his secret passion for gems of the rarest. None of these were ever used for personal adornment by either their owner or his family, except on the rarest occasions. His pleasure in them was that of the collector.

His knowledge of precious stones was that of an expert, and several years ago it was said his collection was worth more than \$2,000,000. One of his delights, in his hours of leisure, was to take out his collection and show it to his friends, explaining the distinctive points of each stone.

From precious stones, his first love, he turned to art. When he built his great home on Summit Avenue, in St. Paul, one of its chief features was the picture gallery, two hundred feet long, and running from one end to the other of the residence. It is finished in oak, with a large pipe organ at one end and a great fireplace at the other, over which hangs Ribot's "Christ Taken from the Cross." Mr. Hill was his own agent in the selection and purchase of his works of art, and it was said that he could not be deceived by spurious works or copies, and seldom failed to discern the true value of a picture.

It was not generally known that he was a fair artist himself. He would take his brushes and palette, and with a keen sense of the values of light, shade, coloring and perspective, would turn out a very fair painting. When he was a boy in the Quaker school in Rockwood, Canada, he used to draw and make copies of famous engravings and paintings.

His picture gallery was said to be a paradise for art lovers. There are eighteen examples of the best work of Corot, which critics say cannot be matched in the world, not even in the Louvre. Among the best examples of this artist's work are his "Bibils." There are also splendid works by Fromentin, Decamp, Puvis de Chavannes, Millet, Troyon, Bouguereau, Banvin, Cazin, Henner, Laurens, Jules Breton, Daubigny, Dupré, Delacroix and Diaz. No estimate of the value of his collection has ever been given, but it is known that Mr. Hill seldom paid less than \$50,000 for a picture.

GIFTS TO CHARITY.

Mr. Hill was generous in his charities, and had given hundreds of thousands of dollars to the worthy poor. When he gave up his old home in St. Paul and moved into the Summit Avenue mansion, he gave the old residence, complete in all its furnishings, to the Little Sisters of the Poor. In addition to this gift he had always contributed largely to their work in St. Paul and the Northwest.

He took an active interest in the Catholic College, near St. Paul, and gave it an endowment of \$500,000. Mrs. Hill was always a devout Catholic, and they were married in a Catholic church by a priest. Mr. Hill also gave largely to other church organizations and charitable societies.

In 1908 Mr. Hill bought the house at 8 East Sixty-fifth Street, where he made his home when in this city. He was a member of the Union, Metropolitan, Manhattan, Jekyl Island, Down Town and New York Yacht Clubs, and an honorary member of the Rocky Mountain Club. In addition, he belonged to numerous clubs and other organizations in the West.

THE INTERSTATE COMMERCE COMMISSION AND ITS WORK*

BY E. E. CLARK.

Member of the Interstate Commerce Commission.

In some quarters the tribunal of which I happen to be a member is accused of entertaining, and of exercising, a spirit of hostility toward the railroads. If a railroad, whose financial history has been little, if anything, less than a public scandal from a time that antedates the enactment of the act to regulate commerce, goes into the hands of a receiver, certain publications solemnly announce that it has been forced into bankruptcy through the hostile and unreasonable policy and actions of the Interstate Commerce Commission. If the Commission finds that certain proposed increased rates are reasonable, those same writers sneeringly assert that it is a delayed and reluctant granting of but a small part of that which should be granted to the railroads. If the members of the Commission disagree as to the propriety of, and justification for, the proposed increased rates, they assail those members who disapprove and laud those who approve. Thus, if a commissioner happens to be on one side in one case and on the other side in another case he is both approved and disapproved.

CRITICISM OF THE COMMISSION.

From another quarter we are accused of being desirous of doing only those things that the railroads wish us to do; and the assertions and accusations from that quarter are as extreme and as violent as are those emanating from the quarters first mentioned.

And so, dependent upon the point of view, we are different beings, animated by different impulses and doing things which are diametrically opposed to each other. But is the one who will not see more than one side of a question, who attributes dishonesty to everyone who does not see as he does, and as narrowly as he does, necessarily the only one who sees rightly? Is his point of view infallible? May not some of his conclusions or deductions be wrong?

*Address before the National Industrial Traffic League, at Toledo, Ohio, on September 9, 1915.

I remember reading when a boy a poem which described the trip of six blind men of Hindustan to see an elephant. The first approached the animal and happening to fall against its side exclaimed, "Why, bless me, but the elephant is very like a wall." Another chanced to grasp the elephant's tusk and asserted that the beast was like a spear. The one who came in contact with the elephant's ear declared that the animal was like a fan; the one who grasped the elephant's tail was sure that the elephant was much like a snake; the one who laid hold upon the elephant's trunk was certain that the animal resembled nothing but a tree, etc.

And so these men of Hindustan
Disputed loud and long,
Each in his own opinion
Exceeding firm and strong,
Though each was partly in the right
And each was in the wrong.

Every nation or people has a national sport, pastime or game. I have long known that in the United States we had two national games. The first is played in small parties, and generally in private. Of that one I will only remark that no one cares to play with the man who continually grumbles because he cannot win every pot. The second, baseball, is played in public; the crowd is always with the home team, and many of the onlookers find their greatest enjoyment in roasting the umpire. Of late I have been almost inclined to think that a third pastime—finding fault with the Interstate Commerce Commission—is becoming so popular as to be almost national, and I am disposed to pattern after the manager of a Texas baseball team, who appealed to the crowd, "Don't shoot the umpire, he is doing the best he can."

But, seriously, the questions which you gather together to discuss, and with which you deal, are parts of a problem of tremendous importance. Transportation is the very life blood of the commerce of the nation. The railroad industry of this country is probably, with the exception of agriculture, the greatest of our industries. Efficient and adequate railroads are essential to the maintenance and expansion of our commerce. Under our plan of private ownership, railroads have been, are, and will be built only when those who promote and further the enterprise have faith that in due time it will be profitable. Excepting the lands which were granted to some roads, a railroad has only transportation to sell and no other source of revenue. The railroad company, created by public grant of fran-

chise, is obliged to assume certain obligations, among them the regulation by public authority of many of its affairs, and is given certain privileges and guarantees, among them the right of eminent domain and protection against confiscation of its property through regulation or other means.

It must submit to regulation because otherwise, as has been amply demonstrated, unjust discriminations, undue preferences and unreasonable rates would be indulged in and imposed, and commerce, instead of flowing in natural channels, would thrive or languish according to the will of those who possessed the transportation facilities. Business, manufacturing, producing and marketing would all be subject to artificial domination and control. It must be accorded the right of eminent domain, as, otherwise, spite and greed would throw insuperable obstacles in the way of its construction. It must be protected against confiscation because it is, after all, private property which the public has no right to use except upon the payment of reasonable compensation.

I do not doubt, and I have never doubted, the willingness of the great majority of the people to pay reasonable compensation for reasonable and proper service. I do not doubt the willingness of the great majority of those who manage the affairs of our railroads in these days to furnish good service in return for reasonable compensation. The difficulty comes in the difference of opinion as to what is reasonable compensation, either as a whole from all of the traffic, or in individual instances. These differences are often so acute that they must be decided by some disinterested, impartial tribunal, and manifestly they should be heard in an open forum in which all parties' rights are respected and protected.

THE COMMISSION DOING THE BEST IT CAN.

Under our form of government these questions, in so far as they do not involve confiscation of the carriers' property, are within the jurisdiction of the legislative branch of the government. Acting within its lawful powers, the Congress has delegated certain authority to a body created for the purpose of deciding controverted questions of unreasonable, unjustly discriminatory or unduly preferential rates, rules, regulations or practices. That body, like the Texas umpire, is doing the best it can. I do not mean that it is doing the best it can to please everybody. It does not aspire to accomplish the

impossible. It is doing the best it can to discover and establish that which is right, reasonable and just. It stands with its face to every wind that blows, decides the questions that come to it in a judicial spirit, endeavors to be helpful when it can in promoting harmony and thorough understandings between the carriers and their patrons, and does not worry about whether or not its decision or action is going to be popular.

The act to regulate commerce has been on the statute books since 1887, but it can fairly be said that real regulation under it dates back only to 1906 when by amendment the act was given vitality. The problem was not then, and is not now, to devise a model system of rates and regulations for railroads not yet built, or for industries and communities not yet located or developed. The conditions of trade and transportation that had grown up in a rapidly developing country served by railroads that had always been operated as private industries, free from governmental control, each going its own way in accord with the policy or ideas of those who for the moment were in control of it, had to be dealt with.

I think the court was perfectly right when it said that the purpose of the act was to promote and not to hamper trade and commerce. We may see situations and conditions which are wrong and which apparently should be corrected. But if, upon thorough investigation, it is demonstrated that in order to correct it other situations equally as bad, or worse, will be created, no real progress is made by forcing such action. The conditions which the law was enacted to correct or overcome did not grow up in a day and they cannot be corrected or overcome in a day without doing inestimable and irreparable injury. The evils at which the law is aimed were not created by one party to the transactions. No railroad official ever paid a rebate except to some receptive shipper. The ideal situation cannot be attained except through a general disposition and desire on the part of both railroad officials and shippers to support and observe the principles which form the foundation and cornerstone of the law. Just such associations as yours and the various traffic clubs of the country assist in getting men to think alike, and when they think alike, there is little trouble about getting them to act alike. The solution of these profoundly important and far-reaching problems must be approached and dealt with in a broad way. The foundation must be laid in sound principles of right. If a railway company imposes wrongs upon, or deals in bad faith with, an individual

or a community, its owners may expect hostility against the company and its interests. If a shipper defrauds or attempts to defraud the railway company by falsifying as to his shipments or his claims he cannot expect its officers to attach much importance to his representations in a matter that is of real importance to him, and in which his contentions are right. Every temporary or transient advantage that is secured by trickery or by evasion of truth and right retards the progress toward the conditions which we all should seek to enthrone.

The law provides that the patrons of the railway shall be accorded reasonable and nondiscriminatory rates and service. If he has been charged an unreasonable rate or has been damaged by an unlawful discrimination he may recover reparation. If the railway maintains an unreasonably low rate it cannot repair losses sustained as a reason thereof on past transactions. If the railway maintains unreasonably low rates as to some traffic or as to some communities, it may not recoup itself by laying unreasonably high charges against other traffic or other communities. This principle has been well established in recent decisions of the courts.

REASONABLE RATE A QUESTION OF JUDGMENT.

And this leads to the query, What is a reasonable rate? There is no statutory definition of it. No scales or yard sticks are provided by which it can be weighed or measured. It cannot be determined solely by the cost of the service, because that cost, plus a reasonable profit, might, as to some commodities, be prohibitive. It cannot be measured alone by the value of the service, because that would open the way for the railway to absorb, as to some traffic, the profits that legitimately belong to the shipper. It cannot be ascertained from a consideration of distance only, because so to do would destroy competition between producing fields and in common markets. In the last analysis it is a question of judgment, and very properly, the judgment that finally controls is that of a disinterested, impartial tribunal, whose decisions must be made only in the light of full hearings and proper investigations, and are, as to matters of law, reviewable in the courts.

Some questions, which to my mind are of fundamental importance, remain to be decided by the Commission and the courts, or to be disposed of by the Congress.

SOME UNSETTLED QUESTIONS.

As I have suggested, the laws guarantee the owners of the railways against confiscation of their properties. What constitutes confiscation? What is the reasonable profit which the railway may lawfully demand? Upon what property may that profit be based? I think that the courts have clearly laid down the principle that the carrier is entitled to earn a reasonable return upon the property that is devoted to the public use, as of the time of its use. Now come the questions, What is the value of the property, and how is it to be determined? Certainly not by figuring a return upon the outstanding bonds and stocks. Two railroads may have been built in a common territory, under substantially similar conditions, at approximately the same time, and should have cost approximately the same per mile. Throughout its construction and operation one of them may have been conservatively managed and financed as a straight-out business venture, while the other one may have been the prey of graft during construction and of plunder under operation. The capitalization of the one may represent actual investment and outlays, while that of the other may represent all the money that those in control of its affairs have been able to borrow, or to raise by the sale, at ruinous rates of discount and interest, of securities far in excess of the cost or value of the property, or of stocks that can never have any value.

Being in common and competitive territory, their rates must, under the law of competition, be the same. Will any one say that the capitalization of these properties forms any reasonable basis for determining what they may properly earn from serving the public?*

Within a period of two or three years in proceedings before the Commission and the courts, one railway company proved by witnesses several different valuations of its property, and the differences in those valuations exceeded one hundred million dollars. The item of interest during construction was variously shown in sums which differed so widely that it seemed obvious they were not taken from any records which were considered reliable or permanent.

Such experiences as this led to the conviction that an official and dependable valuation of the railway properties should be had, and by authority of the Congress that work has been undertaken.

*Commissioner Clark's example and question raise naturally the query whether valuation of these differing roads will furnish any better basis for rates.

The law which was adopted for this purpose is exhaustive and requires the performance of a vast amount of detail work and the determination of many vexed and vastly important questions. No one has blazed the path. The results ought to be sound, equitable and right. When these valuations are finally fixed they will be of great assistance to the Commission and to the courts in connection with cases which involve alleged confiscation of property of carriers. It will not be possible for each railroad to earn the same return upon the value of its property, because controlling competition in transportation and in commercial life will require substantially equal charges in competitive territories, and we have so many railroads and such a vast commerce that there is not much territory that is not competitive.

THE RECENT WESTERN RATE ADVANCE CASE.

There are those who think that if the railroads in a particular section of the country can, as a whole, show that their net return from operation is unusually or unduly low they should all be permitted to increase their charges on all of the traffic or upon important parts thereof. If all of those roads had been constructed, financed and operated on business principles and as business concerns, and the net results of their operation showed an improperly low return, I would find no difficulty in accepting the view that they were justly entitled to such increases in their charges as would render their operation properly profitable. But in such a case the tribunal that authorized such an increase should have the power also to fix the minimum rate so that the burden might not be inequitably distributed. The carrier has a right to fair compensation for each service performed by it, and for its services as a whole. The public should pay such compensation. The carrier is entitled to earn a profit from legitimate enterprise and effort, but when it comes to increasing rates in general or upon an important part of the traffic, I find difficulty in accepting the theory that because certain roads are in financial straits, all roads in that section may properly increase their rates, when the greater number of those roads have for a series of years been able, under existing rates, to maintain their properties in splendid condition, pay all fixed charges and taxes, declare each year handsome dividends upon their stocks, and carry rather liberal sums to their surplus accounts.

I do not wish to draw invidious comparisons, but I want to make this point clear. I do not attempt to analyze the reasons for the

conditions to which I refer as to some carriers, and I refer only to matters that are public property and common knowledge. The Burlington and the Rock Island systems are very generally strongly competing systems. They have operated in common territory and largely under common scales of rates. The one has maintained in good condition a splendid transportation system, has a strong and healthy financial standing, and has regularly paid fair, if not liberal, dividends to its stockholders. The financial condition of the other, and in general, the reasons therefor, you all know.

And so I say that, while desirous of according that which is right to the carriers as much as to the shippers, one may well hesitate about assuming responsibility for approving large increases in rates for the purpose of relieving a financial strain that is composed of the average of the necessities of such roads as the Burlington, the North Western, the Union Pacific, the Great Northern, the Northern Pacific and the Santa Fe on the one hand, and the Frisco, the Rock Island, the Alton, the Wabash, the Great Western and the Missouri Pacific on the other hand.*

The Commission has consistently declined to prescribe rates based alone upon the favorable conditions obtaining as to the short line and the strongest, richest carrier. It should, of course, decline to approve rates based only upon the conditions and needs obtaining upon the line of the carrier that is poorest and that has an unfortunately located line.

UNITED STATES HAS BEST RAILROAD SERVICE.

I have traveled some upon the railroads of Europe. They have some roads which, for those countries and for the services demanded from them, are excellent, well-equipped transportation agencies, which perform an acceptable service. They would not, however, be able to meet the demands in our country. Taking into consideration circumstances and conditions I think that we have the best railroad service in the world. There are many improvements that might

*This line of argument is answered by Commissioner W. M. Daniels in his opinion dissenting from the majority decision in the western rate case, (P. 655 I C C Decisions 1915). After stating his belief that revenues of the carriers as a whole were shown to be inadequate and emphasizing the injustice of withholding relief from all because of the past of a few, he says:

"In considering propositions involving more or less general increases in rates, the question should be judged in the light of the evidence of the adequacy or inadequacy of the carriers' revenues as a whole, and in the light of the reasonableness or unreasonableness of the particular rates proposed, and neither prejudged nor complicated by considerations of individual instances of corporate mismanagement."

be made, and some that ought to be made, but in general it is good and efficient.

The latest figures available show that the charge for the transportation of freight is much lower per ton-mile in the United States than it is in other countries. Glancing over comparative figures for recent years we find that the ton-mile revenue in various countries is: United Kingdom of Great Britain, 2.39 cents; Germany, 1.37 cents; France, 1.3 cents; Austria, 1.45 cents; Norway, 1.6 cents; Belgium, 1.14 cents; Switzerland, 2.92 cents; New South Wales, 1.76 cents, and South Australia, 1.94 cents; while for the United States it was in 1913, 7.29 mills.

These figures, however, do not tell all the story. Referring to other figures we find that the railroads of the United States move 2,737 tons of freight one mile per capita per annum, while in Germany, where the movement by rail is heavier than in other European countries, the railroads move only 582 tons one mile per capita per annum. I believe it has been recognized by successful business men that a large volume of business with a small profit on each transaction is more desirable than a small volume and larger profits on each deal.

The railroads of Europe are capitalized much more heavily than are those of the United States. They are much more completely equipped with signal and other safety devices than are our roads, and generally their roadbed and stations are more expensively constructed and with a view to more permanency.

In many of those countries the railroads are largely or wholly owned and operated by the governments. But on the whole, such ownership and operation has not proven entirely satisfactory, and it certainly has not afforded the people cheaper transportation than could have been furnished under private ownership, properly regulated.

We have 250,000 miles of railroad, serving a broad territory in much of which the commerce and traffic is heavy, and in all of which the commerce and traffic is growing rapidly. We hear much about inducements to build new roads. In my judgment, what is needed is not so much the building of new roads, but the development of those that are already built, so as to make of each an efficient agency, properly equipped with terminals and rolling stock, all

maintained in such condition as to afford prompt, dependable and safe service.

If the public demands such roads it must be willing to pay reasonable prices for the services performed by them. If the railroads desire to have and to operate with profit such roads they must convince the public that they are, and are to be, operated along business lines and at rates that fairly compensate for the service performed and yield a fair profit upon the value of the property which is devoted to the public use.

Both the railroads and the public must contribute to the effort to bring about this nearly ideal condition. Each, while guarding its own rights and interests with appropriate jealousy and zeal, must recognize and respect the rights of the other. But even when that is done there will be honest differences of opinion which must be decided by a third party, whose decisions must be based in law and in right, and in whose integrity and fair-mindedness both have confidence.

PROPOSED CHANGES IN INTERSTATE COMMERCE LAW.

And now a few words as to changes in the law and in its administration. I know that you are giving attention to these questions and I disclaim any desire or intent to influence your conclusions or actions. I express a few thoughts along those lines for what they are worth.

The Supreme Court of the United States has decided that the courts have no jurisdiction to review a negative order of the Commission, and some think that this gives the carriers a right that is withheld from the shippers. Personally I see no reason why the law should not give the shippers the same right of appeal that it gives to the carrier. I do not think that such right would be of great benefit to the shippers. The Supreme Court has laid down the limits within which the courts can review the findings of the Commission. The court may inquire whether or not the Commission has proceeded lawfully, whether or not its findings are supported by competent evidence, and whether or not its order invades the constitutional rights of the carrier. If the proceeding has been conducted lawfully, and the findings are supported by evidence, and the order does not invade the carrier's constitutional rights, the court may not set aside the order or substitute its judgment for that of the Commission.

Of course the shipper has just as much right to a lawful proceeding and a finding based upon competent evidence as has the carrier. The constitutional rights of the shipper are not at all the same as those of the carrier. The law does not attempt to regulate the shippers' selling prices.

As has been seen by the annual reports of the Commission, we think that there is a defect in the law in that the periods of limitation within which the carrier may demand the payment of uncollected undercharges are much longer than the period within which the shipper may bring action for recovery of an unreasonable charge. In a few instances this has caused real hardship.

Conditions that are probably different from those that were anticipated have sprung from the most recently enacted amendment to the act to regulate commerce. It has been strongly urged that the amendment was never intended to apply to shipments by express or to the transportation of baggage. We have been unable to discover any clear indication that it attempts to draw any distinction between carriers by rail and express companies. The Supreme Court had held that that portion of the law applied to the transportation of baggage. Congress knew of that decision and it made no provision in the amendment for excluding baggage from its terms. By the canons of statutory construction, therefore, the law must be held to apply to baggage. If Congress desires to exempt the transportation of baggage and shipments by express from the operation of this provision, it can, of course, effect that by further amendment.

The question of reparation for damage suffered from the exaction of an unreasonable rate or from an unjust discrimination has been and is one upon which decided differences of opinion are entertained and expressed. The Supreme Court has made it clear that in a discrimination case the damage suffered may be more or less than that measured by the exact extent of the unjust discrimination, and the true measure of the damage suffered must, therefore, be shown by competent proof. There are those who assert that the same rule should be applied in awarding reparation because of the exaction of an unreasonable rate. The Commission has not accepted this view, but has held that the one who bears the unreasonable charge has been damaged to the extent that the charge exceeded that which it has been found would have been reasonable.

REORGANIZATION OF INTERSTATE COMMERCE COMMISSION.

A good deal has been said and written about the necessity for a reorganization of the work of the Commission, or the Commission itself. No one realizes more fully than do the members of the Commission the magnitude and the complexity of the duties placed upon the Commission. The system under which our courts are organized and their several jurisdictions defined is often pointed to as a pattern for organizing the work of the Commission. Inasmuch as in ordinary litigation before the courts the parties affected are generally all before the court, while in matters coming before the Commission the whole public is interested and many who are not before the Commission in the case may be affected by the conclusion reached, we may well doubt the wisdom and practicability of dividing the jurisdiction geographically, with the certainty that at times cases involving substantially the same facts and the same principle will be decided differently in different jurisdictions. The Supreme Court pointed out the impossibility of maintaining the underlying principles of the act if the courts in their several jurisdictions were to pass upon questions of an administrative or a quasi-legislative nature.

The Commission has given much thought to this subject and to the various plans that have been suggested for simplifying and expediting the work of the Commission and reached the conclusion that the largest measure of relief and the best results would be secured by enlarging the membership of the Commission, and authorizing it to divide itself into groups or divisions, each division to have and exercise all the powers of the Commission in the matters or cases referred to it. This would give us a mobile but still a centralized body, which could change its divisions and assignments to divisions when and as circumstances might require.

Personally, I feel that the valuation work is of such magnitude and importance and of such a technical nature that a Commission or a division of the Commission should give their undivided attention to the new and intricate problems which will arise in numbers as that work progresses, and especially as the time for fixing upon a valuation approaches.

The Commission can perform the many duties devolving upon it only by thorough organization of its several bureaus and calling to its aid the most competent assistants available. Some features of

our administrative work, as for example, the safety appliance features, are so well organized and the principles of those laws are so well defined and established that they give the Commission but a minimum of trouble and demand but little of the time of the commissioners. Where work or business expands with rapidity it is not always possible to extend an efficient organization as rapidly as might be wished.

The development of effective and beneficial regulation of the affairs of an industry of such magnitude and vital importance as that of transportation in this country is absorbingly interesting. It inspires one who is actively engaged in the work to bring to it his best thought and efforts. It brings to one a tremendous responsibility, plenty of hard work, and like all public service, more or less unjust criticism. Bearing responsibility does not wear heavily on the one whose heart is in his work and who has the courage of his convictions. Hard work does not hurt one, and unjust criticism, while unpleasant at times, will never affect the judgment or influence the actions of the man whose conscience tells him that he has done the right thing in the light as it is given to him to see.

But, be he never so able, the commanding general cannot win battles without assistants and soldiers, the manager of a successful industrial concern or railroad must have the loyal co-operation of his forces, the executive or administrative official who succeeds must have the cordial support of others who desire to see and participate in his success. And so, in order that those conditions which all right-minded men would be glad to see in the transportation business may be attained and firmly established, it is necessary that you and many others contribute each his part, no matter how small. As the light grows stronger and better days dawn for railroads and their patrons as a result of these efforts, everyone who has contributed to the better order of things by some helpful word or action will experience a sense of satisfaction over a good deed done.

AN UNFORTUNATE RAILROAD PROJECT

From RAILWAY ENGINEERING.

There was only one man who could build a railroad without money and without credit and make it pay. He is dead.

An interesting example of the mistakes which are sometimes made by promoters who have an idea that a railroad will be successful, wherever it may be built, and however financed, is presented in the case of the Atlantic and Southern—thirty-seven miles long, running from Atlantic to Villisca in the State of Iowa.

It was built in 1910 with money which was to be raised by taxation, and money and services to be furnished by the people who lived along the proposed line. The people were to receive bonds, as soon as the road was finished. Contractors and enterprising citizens who contributed right of way were to receive bonds for their interest also. Material furnished and work for the necessary grading were likewise to be covered by bonds. The credit system was in vogue in its most extended form. When the tax collector called on the once hopeful farmers to pay the assessments levied on account of this public utility they objected to its payment; called on the courts for relief and secured an injunction restraining the county treasurer from paying out any money which might have been collected, and restraining the collector from making any more collections. The graders and other parties in interest placed a lien on the property in turn, and following this everybody with a claim did the same thing, until a receiver came into control to complete the handicap. Eventually, under a court order, the railroad was sold. The buyers, at the sale, made serious efforts to raise the necessary funds to make the payment and failed. An extension of time was granted to aid them. They failed again to meet their engagement, and several other extensions were granted, also without results, so that the sale was finally cancelled. A second sale, which had been ordered, found the same buyers on hand once more. This time their bid was so low that it was flatly rejected, and another sale was ordered. On this occasion the bondholders on one end of the system bid in that much of the railroad and the claim holders on the other end bid in that portion. The bondholders' end lay dormant and unopened, but the other end, controlled by the

claim holders, representing a corporation with only 300 directors—the size of the road did not warrant any more—began operations in August, 1913. It soon became apparent that it did not pay to operate it. The track had never been ballasted; the rails were full of kinks; business was shamefully bad, and the cost of maintenance heavy, so that the owners ran the last train on December 31, 1914, and closed operations altogether.

Now the people who wanted the railroad and later turned about to assist in its downfall called upon the Railroad Commissioners of the State to order the owners to operate the road, whether it paid or not, and such an order has at last been issued to take effect January 1, 1916.

Thus we see upon what a flimsy basis, sometimes, a railroad is projected. The public, like individuals, are likely to be fickle on occasion, and may turn from one extreme to another, as they have in this instance. Railroad building in these days requires much careful consideration to insure success and the necessary support. The bondholders were wise. They never opened their end of the line, and its prospective patrons were not therefor in position to demand its operation. It had never been dedicated to public use.

THE NORTHERN RAILWAY OF FRANCE IN WAR TIME

Translated by FRANCIS A. BONNER, From *Journal des Transports*.

It would be interesting to our readers, we believe, to have some description of conditions on the railroads most seriously affected by the war. We shall attempt to trace, briefly, the situation on the Northern (Chemin de Fer du Nord).

The Northern, as every one knows, of all French railways has suffered most from the conflict. But the majority of our readers probably will be surprised to learn that on September 3, 1914, of the 2,381 miles which had comprised the system before the war there remained in operation only 428 miles, less than 18%. What should not be, therefore, our admiration for the personnel of the Northern, of all ranks, when we think that it was with this rudimentary fragment that there was undertaken and carried out that tragic "Rush to the Sea," upon the outcome of which hung the fate of our northwestern provinces, possibly of all France.

Today (December, 1915) the operated mileage of the Northern measures 1,225 miles, about 51.5% of normal. Of 768 stations, 346 are now occupied by the enemy or closed to traffic, and of the 412 which remain accessible a certain number can be used only for military purposes. This situation, which has existed for a year, has deprived the Northern of the greater portion of its main arteries, leaving none but the road from Paris to Creil, Amiens, Boulogne, Calais and Hazebrouck as the sole main double track line, with some double tracked branches and some single track lines of hilly profile.

The moment has not yet arrived for telling in detail what has been done to secure the maximum return from this diminished system. There remains to be written in that regard a splendid chapter on the work of the railroads in the war. We shall limit ourselves for the present to giving simply the results obtained on the Northern so far as concerns commercial traffic. One may say that since the beginning the task of the Northern was, while reserving first place to military transportation—and it was considerable, everyone

well knows—at the same time to safeguard in the greatest measure possible the economic life of the country, and to place at the disposition of commerce the means of transportation it needed. This task was the more pressing in that the system serves one of the leading industrial regions of France. But the invading German armies did not delay in engulfing the rich countries of the north and reducing the activity of that recently so flourishing region.

First efforts were centered on serving the coal mines of the Departments of Nord and Pas-de-Calais, the output of which was to be used entire. The German invasion unhappily reduced the number of mines in operation and deprived France of the production of all coal in the Department of Nord and of most of the important mines of Pas-de-Calais (Courrieres, Lens, Lievin, etc.). But the coal mines in the non-invaded territory, that is to say Bethune, Bruay, La Clarence, Ferfay, Liguy, Moiles, Noeux and Verdun, organized rapidly and their production now equals and in some instances surpasses that in time of peace. It is a remarkable feat, in particular for the mines of Noeux and Bethune, which worked under hostile cannon fire and underwent almost daily bombardments.

Some figures will better show the importance of what was accomplished.

During the first half of 1915, the Northern transported (including reshipments) nearly 4,300,000 tons of combustibles against about 10,700,000 tons during the first half of 1914, a diminution of 60%. Of this tonnage the mines of Pas-de-Calais furnished 2,700,000 tons against 8,300,000 in 1914, a diminution of 67%. Importations of coal at the frontier, which had reached about 1,500,000 tons in the first six months of 1914, naturally disappeared. On the other hand, importations of coal at seaports rose in the same period from about 465,000 tons in 1914 to more than 890,000 tons in 1915, a gain of over 90%.

Though the coal mines have given so comforting a sign of resistance, other industries have suffered a cruel blow and been reduced to almost nothing. Thus the metal industries, so flourishing before the war in the region served by the Northern, where it converges between the Sambre and the Escant, have been more sorely tried than all others by the violation of French soil. The regions of Valenciennes and Maubeuge, centers of the metal industries of Nord,

were among the first crushed by the invader. Thus the tonnage of minerals and metal products, which in the first half of 1914 had touched above 3,300,000, tumbled to 280,000 tons in 1915, suffering a reduction of over 90%. The ceramic and glassware industries, centers of which were Aniche, Valenciennes, Jeumont, Chauny, fell likewise to almost nothing, going from 170,000 tons for the first six months of 1914 to 16,500 for the corresponding period of 1915, a loss of 90%. Traffic in construction materials, as everywhere in France, was seriously hit. Although in 1914 the tonnage for the first half year had reached nearly 4,800,000 tons, it was no more than 565,000 tons in the same time in 1915, suffering a loss of 88%.

On the other hand, shipments of wine made considerable gain (about 80,000 tons, or 43.4%) applying especially on the products of the South. Sugar beets gained 280,000 tons, but this gain is fictitious, arising from the late harvesting of beets which prolonged the sugar season 1914-15 to May, 1915, though the season 1913-14 ended in February, 1914. Comparing the beets shipped during the two seasons, one reaches the following figures:

September, 1913-February, 1914, 1,800,000 tons; September, 1914-May, 1915, 600,000 tons, a loss of 1,200,000 tons, or 66%.

Let us now take a glance at the aggregate traffic cared for by the Northern during the first half of 1915. The total tonnage reached 7,200,000 tons against more than 24,000,000 tons for the corresponding period of 1914, a loss of about 17,000,000 tons, or 70%. But to appreciate more clearly the situation of the system one must compare the traffic of the stations which were open in 1915 with the traffic of these same stations in 1914. We reach then a tonnage of 7,200,000 tons for the first six months of 1915 against nearly 9,400,000 tons for the corresponding period of 1914, a loss of 2,200,000 tons, or only 23.1%.

This result lacks nothing for reassurance and shows with what energy and ingenuity our valiant French people have been able to overcome the terrible difficulties caused by the general mobilization and the war. One must remember not only that labor is scarce and that raw materials are scarcer, but that industrial and commercial interests of the north and northwest of France have been deprived of their important markets in the invaded regions, which were among the richest of France. One must remember also that commercial transportation was forcibly restrained on the Northern

by the needs of the military and the necessity of dispatching on the few lines in operation numerous transports of troops, materials of war, munitions, provisions, etc.

In conclusion, we shall give a glimpse of the movement of this traffic. During the first half of 1915 trains traversed about 9,796,000 miles against about 19,840,000 miles during six months of 1914, a loss of 50.7%. But these figures by themselves do not give an exact idea of what is represented by the movement on the free portion of the Northern. One must not forget that the Northern was deprived by the invasion of almost all its lines of heavy traffic and that it was with arteries not suited to a dense traffic or with very heavy grades that all this business had to be cared for. The single track lines embraced in the non-invaded territory have further complicated affairs and brought about on certain lines a density of shipments out of proportion with that in times of peace. Thus on certain sections traffic attained double, even triple, that of peace times. A section of single track which had carried 20 trains a day on the average in 1914 bore 31 in 1915. On another the average daily movement rose from 12 trains in 1914 to 39 in 1915. But where the task was most formidable was on the few double track lines in operation. On a certain section of this the mean daily movement rose from 73 trains in 1914 to 178 in 1915; on another from 90 in 1914 to 194 in 1915; on another from 86 in 1914 to 195 in 1915; on another, finally, the movement, very heavy even in peace times, which called for a daily average of 140 trains in 1914, reached the sum of 219 in 1915. On one section of the line, July 16 last, there were counted 285 trains.

All this was achieved almost without mishap and with regularity. Better than a long commentary this proof will bespeak what efforts the workers of the Northern Railroad must have put forth, who are inspired by so high a consciousness of their duty.

BRITISH RAILWAYS

From THE STATIST, April 22, 1916.

When the economic and financial history of this war comes to be written and the causes of its enormous cost analysed, it is evident that the Board of Trade will receive high commendation for their management of the various important commercial transactions for which they have been responsible. Indeed, one regrets that the Board was not entrusted with even wider responsibilities than it has had, and if experience gained in this war is ever needed again, it is evident that all commercial matters connected with war should be placed under the Board of Trade. One of the best bargains the Government has made during the war was its agreement with British railway companies, under which the railways were taken over by the State during the war on a rental of the net earnings of the year 1913, less a percentage allowance for the decline in net earnings that occurred in the first six months of 1914. This meant a sum equal to the net earnings of 1913 with a discount of about $2\frac{1}{2}\%$. Out of these net earnings the companies agreed to pay the whole of any additional interest charges. Subsequently they agreed to pay 25% of the war bonus given to railway employes who came within the Conciliation scheme. When a further increase in the war bonus to 5s. per week per man was granted, the proportion to be paid by the railway companies was reduced, from 25% to $12\frac{1}{2}\%$. Against this increase in wages which the companies agreed to meet out of their net earnings they were however relieved of the discount of $2\frac{1}{2}\%$ on their net earnings of 1913. The result of these various arrangements is that the Government during the period of the war has leased the railways on the basis of their net earnings in 1913 less $12\frac{1}{2}\%$ of the war bonus granted to the men, and that out of this rental the companies have to meet any addition to their interest charges. Having regard to the enormous amount of work which the companies have performed and are performing for the Government, and the immense strain that has been placed upon the railways by the war, it will be obvious that this arrangement was a great bargain for the Government. From the point of view of the companies it would have been very much more advantageous to have charged the Government for work performed and carried on

business as far as possible as usual, for as matters now stand railway profits have appreciably declined, while the profits of practically all other trading companies working for the Government have largely increased. In 1913 the net profit of 29 railway companies available for dividend upon the Ordinary or Deferred stocks was £16,605,000, but in 1914 the profit fell to £15,204,000, and in 1915 when the amount of traffic carried was so great it was no more than £15,298,000, or £1,307,000 less than in 1913. In other words, the country instead of having to pay anything additional to railway stockholders for the use of their capital during war have paid less than usual.

During the war industrial securities of many kinds have risen in value, while railway stocks have fallen heavily in consequence of the unfavorable terms under which the railways are leased, but it may be that when peace is concluded industrial securities which are benefiting from the war will fall in value, while railway stocks which have been hurt by the war will appreciate. The possibility of this taking place is increased by the fact that railway traffic normally expands substantially from year to year, and rarely or never declines. It is outside the scope of the present article to discuss the question of whether or not the volume of business in this country will be greater after the war than it was before the war, but, as far as it is possible to see, the volume of railway business certainly should be greater, although it may show decline from its present amount, and we look for substantially large gross earnings from one cause and another. Moreover, the lessons that are being gained by working the railways as a single unit should be of great subsequent advantage. As far as it is possible to form an opinion we certainly anticipate that British railways will not have less earning power when peace is concluded than they had before war was declared. It is true that during the war wages have appreciably risen, but this is due in the main to the great advance in prices and in the cost of living that has occurred, and when the war is over the fall in prices, coupled with the greater efficiency of labor, should do much to enable the railways to secure at least as much net profit in proportion to their capital as they enjoyed prior to the war.

BRITISH RAILWAY WOMEN AT WORK

The following reproductions illustrate how female labor has been mobilized to take the place of the British railway workers

who have joined the colors to the number of over 120,000. Note also the slackers. The scenes represented are at the Freight Depot of the South-Eastern and Chatham Railway at Bricklayers Arms, London.



WOMEN UNLOADING A VAN



WAR WORKERS HANDLING SUPPLIES FOR THE ARMY SERVICE CORPS



HELPING THE SOLDIERS WITH THE CRANE WORK



WOMEN WASHING DOWN THE VANS

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GERMAN RAILWAYS IN THE WAR

(Translation of Statement Issued by the German General Staff.)

In order to obtain a survey of the preparations for the "Railway War" one must remember the conditions in Germany during the critical days at the beginning of August, 1914. It was the holiday and tourist season. The large maneuvering grounds in every military district were filled with troops. The freight traffic was normal. Everybody believed till the last moment that peace would be maintained; moreover, war preparations could not, for political reasons, be carried out by the railways.

War was declared on August 2. Everybody who was away hastened to the railway to reach home before the movement of the military transport began. Relatives visited their sons and brothers to take leave of them before they left for the front. The troops taking part in the maneuvers were sent back to their garrisons as quickly as possible. The mobilization of our armies had to take place partly in the western industrial district. Thousands of long military trains had to be dispatched there. By this time the railways had to be cleared of the large number of loaded and unloaded freight cars in order that there might be no hitch in the forward movement.

At the same time other transport movements began throughout the entire fatherland. Long trains of empty cars and lines of locomotives coupled together were sent to those places where, after careful consideration, cars and engines were greatly needed at the beginning. It is easy for anyone to understand the reason for all this railway traffic. First of all, there was the transport of millions of reservists and "landwehr" men to their respective posts; then followed the transport of provisions and material for the troops and the armaments for the fortresses. In the districts of Germany which provided the horses, trains ran at specified times in every direction where the full complement of horses was needed as against the number under normal conditions in time of peace. Long trains filled with meat proceeded to the army preserving factories from the districts providing cattle. Finally, from the very beginning of the war there was a constant flow of coal trains from the collieries to the naval ports.

A very few hours after mobilization there was the first great rush of troop trains. These were filled with men bound for the frontiers in order to guard them against enemy invasion. From day to day this traffic grew until our armies stood at the frontiers and numerous depots behind the first line of troops were filled with provisions, ammunition, etc. This was, indeed, a great traffic in Germany! The movement of transports was carried out without a hitch. How easily might a very serious accident have happened at any one place on our vast railway system, through human neglect or by criminal hand, which would have seriously delayed the arrival of troops at the frontier! The railway authorities had, therefore, in their primary preparations to take into consideration our geographical position and see where the most vulnerable positions lay. In time of peace trial trains were run to these various positions, so that if war broke out there should be no hitch in the transport of troops. Preparations were made, therefore, for all eventualities.

The organization of the military railways has already proved successful during the present war. When the commander of a force on the march receives news of the enemy's whereabouts and has to proceed elsewhere, trains are in instant readiness to take him to the scene of operations. The ability of the officers and employes organizing the transport of troops by rail materially contributed to our great successes on the eastern and western frontiers, but their greatest reward was reaped in the latest victories in Galicia.

The essential condition for the prompt transport and mobility of troops by rail is to have at one's disposal a well-developed railway system. When the mobilization of our armies to the frontiers was complete and the forward march had begun, the chief of the railway section, as "Chief of the Military Railway Organization," and his staff proceeded to the field with His Majesty, the Kaiser. From the day of mobilization the relations of the so-called "military railway authorities" with the German railway administration proper were completely changed. Numerous railways in Germany have since then been amalgamated with the "war section," that is to say, the various individual railway administrations are now subject to the orders of the "Chief of the Military Railway Organization," in respect to everything relating to the running of trains. This chief issues to the railway commando ("working notices") for regulating the war traffic. He has also at his disposal for this work the machinery of the railway section of the great general staff in Berlin.

To the German railway system were soon added the railway districts in conquered territory. Our troops penetrated very quickly far into the enemy's country, yet, on practically all battlefields the enemy still found time to blow up most of the large bridges and numerous tunnels before retreating. Our railway tracks had, of course, to follow very closely behind the advancing armies, so as not to impede their forward march. This required the prompt repairing and putting into working order the enemy's dismantled railways. To this end, when mobilization took place, two military railway administrations were forthwith formed to organize railway traffic in the conquered districts exactly similar to railway administrations in the fatherland itself.

One of these two administrations awaited at Aix La Chapelle (Germany) for the time when it could proceed to Belgium. The officers of the railway regiments accompanying the first line of troops immediately reported all damage done to lines and buildings entirely deserted by the enemy right into the districts of Hasselt, Louvain, Namur and Marloie. Apart from numerous minor damages, such as tornup rails, overturned engines, etc., thirteen bridges were found blown up, while a tunnel was blocked with several engines which had been made to telescope one another at full steam. Telegraph and telephone wires had been destroyed and all instruments in the stations were rendered unserviceable. Moreover, the railway roadbeds in Belgium in most cases were in a sadly neglected state and the rails were bad. Very often the sleepers broke under the weight of our engines.

Here our regular railway troops had to commence work. They labored with almost superhuman effort so as to facilitate the bringing up of provisions and ammunition for the advancing armies. Very often long troop trains in close succession had to be brought over these lines, after one line had been cleared, and the working of the stations was taken over by railway officers with a few men. For instance, never before had a German engine been west of Liege until the first train filled with German troops going to reinforce their comrades fighting hard around Brussels ran into the station and had to proceed to Louvain. The lines between Liege and Louvain were repaired one at a time. Staff, there was none. The telegraph and telephone communications between the stations had not yet been restored. Nevertheless, train after train proceeded to Louvain and the empty

trains returned the same way. Although the trains were fired on from the houses by the infuriated population and continual cowardly attacks were made, the troops were brought up in time against the enemy and could still participate in the deciding victory. The repairing and putting in order of the railways proceeded little by little. On September 1 the Military Railway Administration arrived in Brussels and proceeded to Lille toward the end of October. The last-named administration was taken over by newly-formed railway commandos in Liege and Brussels.

To the south of Military Railway Administration No. 1, Military Railway Administration No. 2 was set up on August 20 in Uiflingen; on August 25 at Libramont and on September 4 at Sedan.

A newly-formed railway commando followed in Luxembourg. The district covered by these various railway administrations was in time so extensive that a third was pushed forward between them, controlled from Charleroi. In the East, presently, a railway commando was set up in Lodz for the conquered districts of Russian Poland.

All these authorities are organized by the Military Administration. The railway traffic is essentially of a military nature and is carried on in the districts close behind the front by railway troops; and, farther in the rear, by ordinary individuals transferred from the German railway administrations.

The constructional operations of the railway troops consisted during the first months of the war chiefly in restoring damaged railway buildings so as to provide as quickly as possible complete railway communications for the army. New lines were laid where the military authorities needed them most or where our railways had no extensions in the conquered territory. Owing to the unfavorable country and the bad conditions of the roads after such a wet winter, we were obliged to construct a railway system comprising innumerable small "field railways" so as to bring up ammunition and provisions to the particular place where our troops were located.

In the place of emergency bridges we had to build later bridges of a permanent character so as to give greater security to the ever-increasing traffic. These operations at the seat of war were carried out by the railway troops and farther back by private German firms.

During the course of the war up to the present, 104 large bridges have been built, 8 tunnels restored and 14 lines opened to traffic. Owing to increased number of lines over 160 stations have been enlarged for the purpose of loading and unloading; also numerous crossover points have been built.

The following table will give an idea of the development of this military traffic in the enemy country conquered by us with the exception of the Russian lines bordering on East and West Prussia, east of the Vistula:

TRAFFIC IN THE CONQUERED RAILWAY TERRITORIES.
(BELGIUM AND FRANCE)

FOR THE MONTH OF APRIL, 1915
(In round figures)

1. Distance in Kilometers at the end of the Month:			
	Single line	Double line	Total
A. Used by military.....	3,000	4,100	7,100
B. Leased.....	450	150	600
C. Not in use.....	550	20	570
D. Not restored.....	90	20	110
E. Under construction	400	15	415
Total	4,490	4,305	8,795
2. Traffic Management:			
A. Traffic Officials			75
B. Engineers			25
C. Workshop officials			10
D. Stations occupied			1,200
E. Workshops			70
F. Gasworks			55
G. Power stations			350
3. Benevolent Institutions:			
A. Isolation hospitals			20
B. Bath establishments			130
C. Hospitals			35
D. Red Cross establishments.....			30
E. Dormitories for railway staff.....			135
F. Convalescent homes			5

In considering the above table one must remember that only eight months have elapsed since the railways were taken over under the conditions described previously and the public passenger and freight traffic is still in its infancy. The railways can now, no doubt, respond more efficiently to the demands of public traffic.

SWISS RAILWAYS IN WAR TIME

Correspondence of *The Railway Gazette*, London.

Berne, April 18, 1916.

In no country in Europe probably have the railways suffered so severely from the war as in Switzerland. The 1915 results, which are now just out, enable a comparison to be made between the receipts of last year and those of 1913, the last normal year, from which it appears that the Federal Railways and broad-gauge lines generally have suffered least, and, as might have been expected, the cable railways and cogwheel railways most. The Federal Railways receipts, passenger and goods traffic, decreased in 1915 by 18.2% as compared with 1913; the receipts of the other broad-gauge Swiss lines by 15.4%; those of the narrow-gauge lines by 36.8, of the cable railways by 52.2 and the cogwheel lines by 85.7%, always comparing 1913 receipts with those of 1915, and always for passenger and goods traffic together. The smallest decline was in the receipts of the municipal tramways—11.3%, decrease in 1915 as compared with 1913.

Comparing the 1915 receipts of 34 Swiss railways (not the Federal lines) with those of 1914, we find that in the case of eight only was there an increase as compared with 1914, the receipts of the two most important of these lines, the Berne-Lötschberg-Simplon and the Rhaetian Railways, having diminished in both cases heavily. Again, the January, 1916, receipts of these same 34 railways or railway systems are better in 31 cases than those of January, 1915, but again the Berne-Lötschberg-Simplon has fared worse, and in some cases the improvement only amounts to a few hundred francs. Consequently, Swiss railway matters cannot yet be said to be sensibly improving.

According to the list of Swiss railways published early in 1915, the total length of the Federal lines in working had reached then 1,696 miles, that is, broad-gauge lines only. To this must be added the Brunig line (1-m. gauge), with its 35.7 miles. The 37 privately owned broad-gauge lines, of which the Lötschberg is the chief, have a length of 553 miles; then come 786 miles belonging to the 49 Swiss narrow-gauge lines (excluding the Brunig line already mentioned),

of which the Rhaetian railways are the chief, with a total working length of 171 miles. Next come the 15 cogwheel lines, with their 68 miles length; the 47 cable railways, the longest of which (Sierre-Montana) is only 2.6 miles; and the tramways, with their 295 miles length.

As might have been expected, the mountain railways have suffered most, their receipts having diminished in 1915 by over 80% as compared with 1913 and by over 68% as compared with 1914. To take first the best known of these lines, the Pilatus Railway. Its profit and loss account for 1915 closed with a debit balance of \$10,216, but then the number of visitors to Lucerne last year was only 28,484, of whom 20,000 were Swiss; whereas in the last few years before the war Lucerne was accustomed to have as many as 183,000 summer visitors. Even this unfavorable balance, however, must have been very much worse had not the outgoings been reduced from \$26,896 to \$9,696 and savings effected in every possible manner. In 1914, that year of an interrupted summer season, the line still carried 22,064 persons, but in 1915 only 11,132.

As for the Rigi Railway (Vitznau-Rigi), it also can only show a debit balance for 1915 (about \$25,476), which, like the debit balance of the Pilatus Railway, had been covered from reserve funds. The receipts fell off by 90.22% as compared with 1913, while the number of passengers dropped from 72,912 in 1914 to 17,733. As for the Niesen Railway, near Thun, which has the steepest gradient, if I mistake not, of any Swiss railway, it is in very low water. The loss on its working in 1914 amounted to \$4,554, and the management congratulates itself greatly that the result of 1915's working showed an excess of receipts over expenditure of \$889. Consequently, unanimity cannot be arrived at regarding the financial reconstruction demanded by some bondholders. The share capital was some time ago reported as lost, and altogether the undertaking, risky even without a European war to destroy all inclinations for pleasure journeys, is the very reverse of hopeful.

Already in 1914 the Jungfrau Railway had a debit balance of \$43,758, and it is probably one of those tourist railways which can anticipate the immediate future after the war with least confidence, owing to its necessarily high charges. The receipts since the war have not sufficed to pay the interest on the fixed loan, and even in 1914 the entire reserve fund had been sacrificed.

As for the new Chur-Arosa Railway, opened on December 12, 1914, it has not had time to get into such deep difficulties as railways which have been longer in running, nor is it entirely a tourist railway.

By the end of last year the balance of the Visp-Zermatt line was already \$63,670 on the wrong side, its receipts for January to September, 1915, having been 82% below its receipts for May to October, 1913. No dividend, even in 1914, could be paid on the capital of \$579,000, whereas in 1913 6½% was paid.

The deplorable effects of the war on the Swiss railways appear still more clearly if expressed in terms of decreased receipts per working kilometer:—

	Receipts of	In 1913	In 1914	In 1915	Decrease as compared with 1913.
Broad-gauge lines (not incl. the Federal lines)		\$5,218	\$4,911	\$4,219	\$999
Narrow-gauge lines		\$4,561	\$3,172	\$2,009	\$2,552
Mountain railways.....		\$7,538	\$3,641	\$1,162	\$6,376

To refer once more to certain individual Swiss lines. The Lötschberg line, since October last, has been somewhat favorably influenced by the opening of the Munster-Lengnau line, and the fact that in the first five months of 1915 the decrease of passenger traffic was partially compensated for by the heavy goods traffic between Germany and Italy and *vice versa*. In the present year, however, this heavily capitalized line is likely to suffer more even than last year; German-Italian goods traffic has virtually ceased and passenger traffic does not yet show signs of picking up. On December 31 last its fixed loan amounted to a total sum of \$19,791,571, the interest on which attains a sum of more than \$965,000 annually, a large sum for this country. The Rhaetian Railway receipts last year showed a falling-off of 48.84% as compared with 1913, and those of the Bernina Railway of 71.16%, the worst-off of all narrow-gauge lines, however, having been the Bernese-Oberland railways, with an 84.12% decrease of receipts from 1913 to 1915. To whichever part of Switzerland we turn, in short, there is the same melancholy tale.

Taking the Federal Railways, their total receipts for 1915 were \$33,868,173, or \$1,554,792 less than in 1914. The total outgoings, with the utmost economy, amounted to \$23,172,556, or \$1,624,634 less than in 1914. The excess of receipts over expenditure amounted to \$10,695,617, that is \$69,842 in excess of the 1914 surplus. In the 1916 Budget this year's receipts are provisionally estimated at

\$34,657,203, and the expenditure at \$26,503,283. As in 1913, the amount allowed for new constructions has been reduced to an absolute minimum of less than £1,000,000 sterling, (\$4,870,000).

One of the troubles with which the Swiss Federal Railways have at present to contend is the great quantity of their rolling-stock which is perpetually out of the country and consequently useless to them. Not long ago a census was taken of all the goods trucks actually in Switzerland during a certain night, with the result that it was discovered that 4,200 Swiss railway trucks were in France, 1,300 to 1,400 in Italy, and some hundreds more in Germany and Austria.

Concerning new lines, for which, at the beginning of 1915, 78 concessions had been granted, there is not very much to be said. The Munster-Lengnau or Munster-Grenchenberg line, opened last year, passing under the Jura range, $7\frac{3}{4}$ miles in length, is chiefly important because of its improving the approach-lines to the Lötschberg. The new line (9.7 miles) along the Lake of Brienz is being built by the Federal Railways, to facilitate connection with the Brunig line, and the Furka line, from Brigue to Disentis, a tourist railway, is, as might be expected, not making good progress. The portion between Gletsch (Rhône Glacier) and Disentis (Grisons) ought to have been opened to traffic this coming summer, but in the circumstances this will not be the case. The building of the second Simplon Tunnel makes regular progress.

A week ago a narrow-gauge electric line from Berne to Solothurn (Soleure), 16.9 miles long, with a maximum gradient of 30 per 1,000, was opened to traffic. It forms the direct connection between these two places, the journey by it taking only 50 min. instead of one-and-a-half to two hours by the older and more roundabout route. The rolling-stock is similar to that in use on the Montreux-Oberland line, and was constructed by leading Swiss firms. One of the most interesting innovations is that of the introduction of automatic couplings on the system invented by Herren Georg Fischer, of Schaffhausen, which obtained a gold medal at the Swiss National Exhibition of 1914. This apparatus, which is very simple to work, entirely abolishes the dangerous work of railway servants in coupling and uncoupling carriages and trucks. Moreover, much time is said to be gained by its use. This new line, Berne-Solothurn is the first in Switzerland to adopt automatic couplings, and its experience will be watched with much interest.

RAILWAYS IN A SYSTEM OF NATIONAL DEFENSE*

By W. L. PARK.

VICE-PRESIDENT, ILLINOIS CENTRAL RAILROAD.

There is a degree of preparedness for national defense the value of which appears to be recognized by all except an eloquent minority. What the enlightened thought of the people has determined to be essential is that the country should seek to secure itself in such position that if emergency arise it shall not be subjected to immediate defeat. But some of those who clamor loudest for those outward and visible signs of readiness, a strong army and navy, neglect consideration of equally essential fundamental preparations. An army and navy, unsupported by adequate transportation facilities, are merely a transparent bluff. The efficiency of a navy, though it were to outnumber the floating equipment of any other nation, is dependent upon a series of naval bases adequately maintained as to supplies. It is our boast—probably not well founded in fact—that we can quickly provide an army equal to any requirement. The preparation of a transportation system, upon which much of the efficiency of an army, large or small, depends, is certainly a work that requires time.

There is perhaps reason for congratulation that our railroad system as a whole has had its foundations so broadly laid. There is wanting, however, a vast amount of development with a specific purpose in view, before it could begin to fulfill its functions as a part of a system of national defense.

GERMANY'S TRANSPORTATION FACILITIES.

Admittedly, Germany has reached the highest point yet attained in military efficiency. It has for years recognized the value of sufficient military facilities. To serve as a part of its military organization has been the prime consideration—in the construction, equipment, organization and maintenance of its railways. The *Army and Navy Journal*† quotes from the results of a survey

*An address before the International Association of Railway Special Agents and Police, New Orleans, May 25, 1916.

†April 10, 1915.

by a Dutch general of the development of the German railway system from a military point of view since the Franco-Prussian war. As early as 1870-1871 there were at the disposal of the German military authorities altogether 7 railway lines in Northern Germany and 3 in South Germany. Only one, that from Berlin to Cologne, had double track. Yet with these facilities it was possible to convey 16 army corps, an aggregate of 450,000 men, to the frontier in 11 days. Since then military authorities have never ceased in the development of the railway system on a strategical basis. The results are striking. Germany now has 12 double-track railways lying between Osnabrück on the north and Ulm on the south about 125 miles east of the Rhine. Every army corps normally garrisoned east of this district has a double-track railway at its disposal. The same facilities were also available for the reserve army corps formed at the time of mobilization.

No less than 18 double-line bridges were, at the time of the beginning of the war, provided for the crossing of the Rhine. Eight to ten cavalry divisions can be conveyed from the Rhine westward simultaneously with the army corps above referred to. Four brigades with the requisite contingent of cavalry and artillery require 96 trains. All of this number of trains could be despatched in the same general direction in 12 hours. It was thus possible in August, 1914, to effect the whole transport to the western frontier in about 20 hours. The transport of these troops began on the second day of mobilization, August 3, in the evening. It was completed at noon on August 4. During that night the frontier was passed. Liege was assaulted on August 5 and 6.

For the transportation of troops from the western to the eastern front 6 double-track railways were available. The distance from Maubeuge on the west to Königsberg, just short of the Russian frontier on the northeast, is 994 miles. A military train ordinarily makes about 250 miles in 24 hours. This journey, then, occupied about four days. For the transport of 6 army corps of 40,000 men each a week was generally allowed. The transportation of this number of men required 124 trains and two or three days were consumed in the necessary preparation.

The limited amount of double trackage in this country would make impossible any similar movements except in a few sections of the country, for distances which, though absolutely as great as can

be made within the whole German Empire, would be comparatively small when the extent of this country is considered. Nor would double trackage alone, even in Germany, have been sufficient to make the movement possible. The sufficiency of trackage is only one item. Its provision and the entire equipment and organization for its operation, even to a knowledge of what orders would be given under any set of circumstances, have been a subject of expert study and preparation there for 40 years.

During the last twenty months transportation facilities in England and France have been put to a severe test. Apparently they have served their purposes. The chairman of the London & Southwestern Railway stated in February, 1915, that the movement of military and naval organizations had involved up to that time the running of 15,000 special trains. He also said trains had always been ready for the troops and had arrived on or before schedule time. Because of its location the Southwestern has had a large share of this transportation; but several of the other lines reported at about the same date that they had operated from 3,000 to 8,000 special trains in this service. The British transportation service during this war has doubtless owed much of its efficiency to the arrangement entered into between the government and the railways under an act of parliament passed in 1871. The government board is in control of all railway service, but the actual operation in each case is by the railway's own officials.

In France the army took over the entire railway system, absorbing its personnel in the army under direct command of army officers.

THE NEED OF SPECIAL EQUIPMENT.

In the event of war, the transportation of heavy guns is an important factor. The extent of the special transportation facilities absolutely required is probably but little appreciated. The factories where the guns are made and repaired must be located at a distance from the place where their use is required. They must be transported to the firing line. The new 16-inch gun now being developed by the Ordnance Department of the United States army is looked upon with special favor by military authorities. It requires a special car for its transportation. The government does not own such a car, but has obtained the use of one through the courtesy of the Bethlehem Steel Company. The 14-inch gun is

transported on a 200,000-lb. flat car with an ordinary flat car serving as a trailer. Lt. Col. James E. Hoffer, of the office of the Chief of Ordnance, wrote on December 29, 1915, that there had been no difficulty in obtaining the use of such cars on short notice. This, however, is doubtless explained by the fact that there is no demand for such cars in quantity. Only two or three roads, according to the Official Railway Equipment Register for May, 1916, have cars of any class approaching this capacity. The Norfolk & Western has 750 gondolas of 180,000-lb. capacity. The Pennsylvania has about 120 flat cars of 150,000-lb. capacity. Most roads have no flat cars of above 50-tons capacity. The flat car of 200,000 pounds capacity that has been built is for the occasional transportation of heavy guns from the factory to the proving ground, and others approaching that capacity are, with the exception of the Norfolk & Western coal cars, which are in regular service, for limited service of a special nature.

Some of the requirements in the direction of special rolling-stock equipment are indicated by the weight and dimensions of certain of the larger guns constructed by the United States government for coast defense and general service. These are as follows, on the authority of Lt. Col. Hoffer:

Caliber	Weight, lb.	Length	Width
12 in.	132,000	42 ft.	66.2 in.
14 in.	139,000	48 ft. 3 in.	66.7 in.
16 in.	284,000	49 ft. 3 in.	90.5 in.
*16 in.	367,000	67 ft. 2 in.	88.0 in.

All 16-in. guns, therefore, will require for their transportation cars of a capacity of which none have been built except one in possession of the Bethlehem Steel Company. There is only a limited number of cars capable of being used for the transportation of 14-in. guns.

The significance of this lack of equipment can only be brought home by a consideration of the requirements of service in view of the short life of heavy guns under firing conditions. Col. B. W. Dunn, chief inspector of the Bureau of Explosives, American Railway Association, says the number of rounds that heavy guns can be fired before it is necessary to return them to the factory to be relined "depends upon the kind and quantity of powder used in the charge and also upon the action of the rotating band. It was

*Figures relating to the new 16-in. gun are taken from the design, the gun itself not having been built at the date of Lt. Col. Hoffer's letter.

thought some years ago that our most powerful 12-in. gun might not last over 75 rounds, but an enlargement of the rotating band gave so much better results that we now hope to see them last as much as 200 rounds. As a rule, the larger the gun, the shorter the life as measured by the number of rounds fired. My guess (I am quoting Col. Dunn) for the life of the new 16-in. gun would be from 150 to 200 rounds." In the same letter Col. Dunn gives the following information as to the rapidity of fire of these guns: "The only (16-in.) gun now built has not yet been mounted regularly on a carriage destined for it, and we have no data as to the rapidity of fire. A 12-in. gun on a similar mount has been fired as often as 30 rounds at the rate of two rounds a minute. It is estimated that the 16-in. gun can be fired, if desired, as rapidly as one round per minute and possibly faster."

There are 1,440 minutes in a 24-hour day. Under ordinarily favorable circumstances in a continuous action, offensive or defensive, from 8 to 10 guns per day would be required to give the service of one. That is, replacement of each gun—the removal of the exhausted gun and the placing of a substitute—would have to go on at the rate of one for every two and a half or three hours. And for this service between each point of action and the distant factory, the special equipment would be required. Contrary to the general supposition that a position strongly fortified with heavy guns can be supported by the use of those guns until the determination of the action, the foregoing statements indicate how short-lived a fortification must be without the requisite transportation facilities for the necessary relay guns.

THE REQUIREMENT AS TO STANDARD EQUIPMENT.

Adequate facilities are also essential for the transportation of ammunition. Henry Maxim, inventor of explosives, is quoted in a recent book, "War's New Weapons," as saying that "within a circle of 160 miles around Peekskill, N. Y., as the center, will be found 90% of the arms and ammunition works, military stores, smokeless powder works, torpedo works, and torpedo boat works of the entire country."

It is about 2,500 miles in an air line from this center to the Pacific Coast and about 1,600 miles to the Rio Grande. Transportation routes are much longer. Either transportation facilities

must be adequate to annihilate these distances without delay in the delivery of munitions to the various points where they may be of vital importance, or plants for the manufacture of such munitions should be located at points far in the interior. In the way of insurance, either provision or both would seem to be a not over-adequate measure of preparation for possible contingencies.

Transportation of wounded or incapacitated is as important for those still engaged as for the disabled ones themselves. In the British army transportation of the wounded is based on two principles: The maintenance of the mobility of the army by relieving the fighting troops quickly of all who have become non-effective; and the rapid removal of the latter into a region where the best skill and the most favorable conditions are available. Under some conditions this need can be met to a limited extent by the use of water transportation; but the capacity of barges drawn by tugs and such other limited water carrying transport facilities as may be available, as well as means of water communication itself, may be wanting or limited so as to render this adjunct negligible. The main reliance, under all but exceptional conditions, must be upon the available facilities for transport by railways.

It is trite to say that an army fights upon its stomach. But if the matter were analyzed in all its bearings, it would be difficult to determine whether supplies of ammunition for the guns or food and other necessities for the men themselves are the more important. But so far as the equipment of the railways of the United States is concerned, the transport of commissary supplies presents no difficulties that are not a part of the general railway problem, as is the case of the special equipment required for heavy guns. What is required for this service is sufficient rolling stock and terminal facilities, particularly facilities for rapid loading and unloading. The same facilities would be extremely serviceable in time of peace.

In addition to the fighting forces themselves, their heavy guns and ammunition for the light as well as for the heavier pieces, and the continuous service required for the bringing in of commissary supplies and the removal of the wounded or incapacitated, modern warfare as it has developed in its latest example demands a vast supply of equipment never before provided for. Motor power in every form has not only largely superseded the use of horses,

but has been put to new uses. The *Army and Navy Journal* refers to motor plows as used for digging trenches. These plows dig trenches three feet deep and do it faster than a hundred men with shovels. Caterpillar tractors, familiar on the prairies of Iowa and Illinois, haul the heaviest siege guns. Searchlight wagons light the fields at night. Powerful trucks equipped with dynamos are used for charging wire entanglements. Motor aeroplane towing and repair wagons, as well as motor mail wagons, are extensively used.

Motor transportation may be considered as supplying the requirements of local service close to the fighting lines as adjuncts to the railways performing through service. There are available in accounts of events in the European war numerous records of the transportation of a considerable army over appreciable distances by means of motor cars. In the earlier weeks of the war General Gallieni made a sortie from Paris in 4,000 taxicabs and small automobiles. Nine men were put in each. In six hours 70,000 men had been transported about 35 miles. An entire British army of 200,000 men was similarly transferred across country 170 miles in three days.

The significance of these facts in connection with a consideration of preparedness as relating to railways lies in the fact that this special equipment is not likely to be available in quantity at the precise points at which actions are taking place. Most of it must be manufactured at perhaps hundreds of miles from the place where its services are required. It is the function of the railways to serve as the means of transport between place of manufacture and point of use. The service is likely to be continuous in one direction or another so long as it may need to exist at all. In connection with the present war, the life of a horse has been estimated at about 30 days. The life of a motor vehicle, taking into account the forced mileage and rough handling, is probably not so great, at least up to the time that general overhauling and repairs are necessitated.

The use of motor vehicles is not confined to the requirements of the personnel. Backward as is the United States in any matter looking toward military efficiency, the use of motor traction is contemplated in connection with designs for a 9.5-in. howitzer which are nearing completion and designs for an 11-in. howitzer which are under way. The latter piece is expected to be mounted upon a special vehicle to be drawn by a motor tractor. One type of

heavy howitzer has been recommended by the Chief of Ordnance to be mounted upon railroad trucks so as to be fired therefrom. Ordnance officers are quoted as having stated that in the future the size of the larger guns will be limited only by the means of transportation.

Col. Dunn has described one close connection made by the Germans between the army and the transportation lines in which the service of the latter is direct. According to the best information available, he said, the Germans have been using two types of 42-centimeter guns. The more powerful and heavier model is transported from place to place on a special car running on railway tracks. When it is desired to fire the gun, arrangements are made for lowering the weight to a specially-built platform consisting of heavy bolted timber. This relieves the trucks of the weight of the gun so that the special car takes none of the strains due to firing. The projectile weighs 1,918 pounds and the maximum range is said to be over 9 miles. A type of howitzer of considerably lower power, with a range of nearly 5 miles, is transported by tractors over ordinary roads.

The statement that the size of guns and the extent of their use will be limited only by the means of transportation suggests two of the more important requirements of the facilities of transportation. These are in addition to the special equipment required for the 16-in. guns, as before described. Because this class of equipment is special, it should be the property of the government. Such cars in number sufficient to move all the larger guns to any distance and with any frequency required, should be at the service of the government at the place where the guns are constructed or where they, after construction, have been placed. They are suitable only for this class of loading. Railroads cannot be expected to look with favor upon the tying up of so much of an investment as would be required in making them a part of their regular equipment in view of the extremely indefinite frequency of their use.

The first general requirement is a sufficiency of equipment not only for the conveyance of troops and of ordinary supplies, but of such rolling stock as is adapted for the transport in quantity of the heavier items of military outfitting above mentioned, in addition to that which is necessary to carry on ordinary transportation service. The ordinary demands of transportation service can-

not be left out of the account. In many respects the supply of rolling stock equipment fails to be adequate in times of peace. The special demands created by a condition of warfare would magnify this deficiency, at least locally. What would amount to a considerable surplus of equipment under ordinary traffic conditions would be quickly wiped out if the railways should be called upon to perform their essential functions as a part of a system of defense.

To move a field army would require: 2,115 passenger cars; 385 baggage cars; 1,055 box cars; 1,899 stock cars; 775 flat cars; total, 6,229 cars, which make about 366 trains, and require this number of locomotives.

TRACK AND TERMINAL FACILITIES.

Of fully as great importance as an adequate supply of equipment is the requirement that all roadway and track facilities be put in proper condition. This point may be specially emphasized in view of a too-well-founded impression that on many lines during the last two or three years of business depression maintenance of way has been somewhat neglected. Inadequacy of facilities all along the line comes to a head at terminals. Within the last few months we have seen the far-reaching effects of a condition calling for a bunching of equipment at a few points. Such a condition is liable to arise at any one of a large number of points where it might be necessary to undertake measures of defense. It cannot be mitigated by any of the measures which may be partially effective when only commercial considerations are involved. Embargoes, or the condition that necessitates their declaration, would mean starvation to the defensive forces; demurrage would be payable in the lives and property of non-combatant citizens.

An examination of track as well as of all other facilities could best be made by a board composed of railway and army experts. A board of army experts and practical railway men, working in co-operation with the general staff of the army, should be able to accomplish much in determining what would be necessary to fit our railway system as a whole to be operated as a unit and to the greatest efficiency for defensive purposes.

PRELIMINARY STUDY OF PRESENT CONDITIONS.

If not already accomplished, the work of the general staff would probably consist largely in working out, so far as transportation

lines are concerned, what would be the demands upon them at any point of the United States boundary in meeting attacks that might be made at such points. These plans would not be theoretical, but based upon what could actually be carried out with existing forces and supplies. This class of work has been an important feature of what Germany has been doing for many years. The exact knowledge of conditions has been as important as the provision made in adapting its railway systems to meet them. In the case of an offensive movement toward the border, this preliminary knowledge on the part of its military establishment was available so thoroughly in detail, even to the orders to be issued, that Germany could have started a defensive movement at any moment without bungling or hesitancy as to any of the steps to be taken. The results of similar knowledge on the part of other nations were illustrated in the mobilization of most of the troops engaged in the present European war, but particularly is this true with respect to Germany. The absence of such preliminary knowledge in the United States was painfully illustrated in the Spanish war, particularly at Tampa and at points on the Pacific Coast in connection with the campaign in the Philippines.

Through the proposed board the general staff should be informed of the facilities that are now available and of what would be necessary in order successfully to carry out its plans. An expert examination should be made of all roadways and structures over which movements would be likely to take place, to ascertain their condition as to strength and capacity. If too weak or of insufficient capacity, steps for remedying the deficiency should be recommended. The whole outcome of a defensive movement might be reversed by inability to transport some heavy guns across a bridge too weak to permit their passage; or the absence of special cars for carrying heavy guns; or lack of sufficient track and equipment facilities to transport the required number of troops or quantity of supplies within a limited time.

Such a board would keep a live list of all motive power and cars, classified by roads, number and capacity. It should know the location and capacity of all loading and unloading platforms and the steps to be taken to construct them in time of necessity. Lack of these facilities entails delay and congestion. This was noticeable at Tampa in the Spanish war. In some measure difficulties under this head arise in movements to encampments in time of peace.

The board should recommend not only what improvements should be made but by whom their expense should be borne. In any preliminary preparations it obviously would be unjust to compel the railways to stand the expense of providing purely military facilities which could be of no value in their ordinary commercial business.

EMPLOYEES MUST BE UNDER CONTROL.

But the railways cannot be depended upon even to the limit of their present efficiency unless means can be provided for their protection against defection within their own organization. At the present moment, when trouble from any one of three or more foreign sources is threatening, four of the most powerful organizations of labor concerned in railway operation are threatening to tie up every mile of railway in the United States unless certain extreme demands for increased wages are granted. These employees know, because they are part of it, the vital function the railways perform in the commercial prosperity of the country. They know the difficulties through which the railway industry has been passing in the last few years and they know that it is impossible for the railways to meet their demands except there shall be granted measures of relief which must come, if at all, from sources entirely beyond the control of the railways themselves. They know, also, these same organizations that are now threatening to strike, that at a crisis in national affairs such as may materialize at any moment, a strike by operating railway employees would be an act of treachery to the nation to which they belong of which there is no parallel in the civil or military history of any country.

Whatever measure of control the government may be forced to assume over the railways as a part of a system of national defense will be wanting in effectiveness unless it includes absolute control over the personnel of the operating organization. No amount of study or fulfillment of requirements of plant and plans of operation will avail if there is chance of failure on the part of the employees engaged in operation. Employees who have to do with the operation of trains should be held strictly accountable for their acts. Considering the important part that the transportation system must play as an instrumentality in national defense and the fact that no human foresight can anticipate the exact time when our country may become involved in war, it would not be too

much to provide that under no circumstances should a strike that would interfere with transportation be permitted to be called until after all the points in controversy had been submitted to arbitration. In case of actual hostilities all employes should be placed under military control, and any failure to stay at work and perform their duties should be made punishable just as the failure of a soldier to perform his duties is punishable. The safety and welfare of the nation must be given precedence over all other considerations.

PREPAREDNESS AND OUR RAILROADS

BY GEORGE DALLAS DIXON.

Vice-President in Charge of Traffic, Pennsylvania Railroad.

If the word should be flashed over this country that war had been declared and that the United States was about to enter into a conflict with another great world power, our condition of preparedness—what had been done and what had been left undone—would at once become the most immediately vital question before the American people.

As we are virtually pledged against another war of aggression, our military plans must necessarily be plans of defense, with a greater navy, primarily, and a greater army, secondarily, as the most obvious needs. There is danger, however, that the very obviousness of these necessities in any plan of preparedness may blind the eyes of Americans to another necessity which is less obvious but by no means any less vital, and that is adequate preparation for the mobilization and co-ordination of the internal resources of the country.

This means good railroads. Not merely as good as we have now, but better.

Suppose that a hostile army was about to invade our land. Can we exaggerate the importance that would then attach to an internal transportation system at the highest state of efficiency, with every facility ready to render the maximum of service, whether in the rapid assembling and transportation of troops, the movement of munitions, or the carrying of the materials required for the erection of the new plants that would probably be necessary to meet the enormous demands for military supplies?

Just for the sake of argument, imagine that the United States were attacked by some foreign power—England, or Germany, or France, or Italy, or Russia, or Japan, or any other great nation. Consider the diversity of the problems that would have to be met in any one of such contingencies, and then ask the question, What part would the American railroads play in the scheme of national defense and what would be expected of them?

The very existence of the nation, in the unhappy event of a war, might well hinge upon the ability of our interior transportation systems to bear the tremendous burden that would be put upon them, without collapsing. To be certain of so doing, they need great strength, much more than, as a whole, they have today.

The war in Europe has taught no surer lesson than this, that great forces of men, however courageous or admirably trained, are of little military value without the means of moving them with promptness and order and of keeping their many needs continuously supplied. This means transportation facilities that can be counted on to work with the smoothness and certainty of a machine. Without such facilities, all other preparations are useless, and the effort put into them wasted.

The railroads have played an important part in all the great wars of the last three-quarters of a century, that is, in every principal struggle of nations and rulers since the wars of Napoleon. But never before have they assumed the importance that they hold in the present war. Practically every great campaign in Europe during the last fourteen months has centered, at some crucial stage, about the possession of a railway line or junction point, control of which meant rail communication, or the loss of it, for one side or the other. The whole land campaign in the Balkan States, and the intricacies and ramifications and intrigues of diplomacy that have accompanied it, resolve themselves into a struggle, on the one hand, to establish a line of railroad communication between Central Europe and Turkey, and, on the other hand, to prevent the establishment of such a line.

THE STRENGTH OF THE GERMANS.

The ability of the Germanic allies, thus far, to exist within the "Iron Ring" and not only to prevent it from contracting with a crushing pressure, but to push it back here and there and even to break through it in places, is of course due to many factors, but certainly to none more than to that perfection of plans and facilities for railroad transportation in every direction, at any time, which was one of the principal elements in Teutonic preparedness. By her railroads Germany has kept her armies and material resources liquid and they have flowed from one frontier to another with the swiftness and smoothness of water.

The German railroads were built and developed, under a militaristic system, with a first eye for military use. Our railroads were built by private capital to serve the needs of the commerce of a non-militant people, and are in themselves commercial enterprises. This, however, in no way detracts from their value for military purposes, since economic law has seen to it that they connect the centers from which men and supplies must be drawn in case of war.

The American people can make no wiser investment in military preparedness, and can buy no stronger assurance for the preservation of the nation's integrity, than by allowing their privately owned railroads sufficient income at all times :

1. To bring all track and roadway up to standard conditions and maintain it thus.

2. To construct the double, triple and quadruple tracking and to make the terminal extensions and improvements that are required now, by the needs of peace, and which would be of immeasurably greater value if the railroads were ever called upon to assist in military operations.

3. To acquire sufficient supplies of locomotives and cars of modern types, and to reconstruct or replace all obsolete equipment.

4. To hold in the service a sufficient number of well-trained, well-paid and satisfied men, both officers and employes, to assure prompt and efficient operation in any emergency.

Some railroad systems are substantially in this condition at the present time, but many, less fortunately situated, are not. If all were enabled to become so, within a reasonable time, the nation would be possessed of a military resource of inestimable value.

To gain a more vivid idea of what our railroads could be—and ought to be—as factors in preparedness and as elements in an adequate plan of national defense, let us turn our thoughts to some concrete facts. Let us, for example, take the Pennsylvania Railroad System, with its associated lines, and consider what part it could play and what it could offer the nation in time of need.

In the first place, it could offer a trained and disciplined army of more than 200,000 men for the performance of those indispensable transportation services without which the army and navy forces would be helpless.

It would probably not be within the province of any railroad management to decide where its men could perform the greatest service—on the battlefield, or in engine, train and shop—or to interfere with personal freedom as to enlistment, but the Government would no doubt decide that every consideration of wisdom lay in maintaining the organization of this and other railroad systems substantially intact.

The English railroads sent a considerable number of men to the trenches early in the war, but in the first few weeks of the struggle England learned the value—indeed, the absolute necessity—of unhampered transportation, even though the actual battlefields are not on British soil. Both England and France have learned the lesson of the extreme unwisdom of sending to the front those men who have the special mechanical and other training and experience needed to keep up with the enormous demands made upon the national resources for production and transportation.

Secondly, the Pennsylvania Railroad could offer the nation a physical transportation system which handles the most extensive commercial railway traffic in the world—a system embracing more than 11,000 miles of line and over 26,000 miles of track, with terminals in the three largest cities of the country and in eight out of the ten largest centers of population.

This System operates only about one-twenty-fifth of the total mileage of the country, but it carries almost one-eighth of the freight traffic and more than one-eighth of the passenger traffic.

This railroad's rolling equipment consists of the following:

Seven thousand five hundred locomotives with a combined tractive power of 250,000,000 pounds.

Seven thousand passenger cars, with a carrying capacity of 330,000 people.

Two hundred and seventy-five thousand freight cars, with a carrying capacity of 13,000,000 tons.

The locomotives owned by the Pennsylvania Railroad System have power sufficient to haul, simultaneously, over any ordinary grades, soldier trains of 100,000 cars in all. These trains could move an army of from 5,000,000 to 6,000,000 men and would fill a stretch of track as long as the System's main line from New York

to Washington and from Philadelphia to Chicago. No simultaneous movement of men on such a scale would be actually possible, but the figures give some idea of the extent of the transportation facilities possessed by the Pennsylvania Railroad System, and which would be available for the service of the nation.

In addition to carrying facilities, this System has vast shop resources and a great body of skilled mechanics. The railroad shops at Altoona, Pa., alone—the largest of their kind in existence—employ 12,000 hands, a large proportion of whom are highly trained machinists. Counting all the shops on the Pennsylvania System, the total of men who might be called upon for specialized service is 64,600.

The Pennsylvania Railroad has in its service many other men highly trained in the professions and trades, or in special duties which from the standpoint of preparedness might make them invaluable to the nation.

There are in the service of the Pennsylvania System over 700 civil engineers, all of whom have had experience—many of them years of it—in railroad construction and maintenance. Think of the value of these men to the country in directing the work of planning and building the special railroads and bridges that would be required for military purposes.

On the pay rolls of the System are 200 mechanical and chemical engineers, who direct the motive power work at the various shops and round houses, including the repair and construction of locomotives and cars, and supervision of the testing of materials. These men could as readily turn their ability and technical knowledge to military purposes.

It is worth while, also, to consider the extent and resources of the territory which the Pennsylvania Railroad System traverses.

It serves fifteen states and the District of Columbia, having a combined population of more than 40,000,000, or nearly half of all the people in the United States. In this great population there are probably 8,000,000 able-bodied men of military age, with the transportation facilities at hand, for quickly mobilizing them.

In the territory served by this System is located much more than half of the fixed and liquid wealth of the country. It embraces the

metropolis of the nation and its Capital, as well as the principal centers of finance, of foreign trade, of iron and steel production, of ship-building, of the manufacture of armor, heavy ordnance and powder, of meat packing, of the grain traffic and of various other important industries and commercial pursuits.

The region includes, also, the most valuable mineral areas in America. It produces practically the entire world's supply of anthracite coal and about half of the bituminous coal output in America, besides great quantities of oil and other minerals essential to military purposes. It contains great chemical works, and plants for the manufacture of textiles and clothing. It includes agricultural regions of unexcelled fertility which yield every American crop except the sub-tropical fruits and which are alone much more than capable of producing sustenance for the entire nation.

It so happens that, because of geographical location, and by reason of the fact that it links together these principal centers of population and of industrial, mineral and agricultural wealth and production, the Pennsylvania Railroad System as an aid in defense, as in peaceful commerce, would inevitably hold a place among the transportation systems second to none.

Considered from the standpoint of preparedness alone, the resources of the territory served by the Pennsylvania Railroad Lines place this System in the position of a national asset and make the conservation of its property, equipment and organization at the highest pitch of efficiency a consideration of primary importance to national safety.

But the Pennsylvania is only one of the nation's great railroads. For military purposes all of our railroads would have to be regarded from the viewpoint of their possibilities as one system, and the nation can ill afford to allow any part of this country-wide system of 250,000 miles of steel highways to deteriorate or to continue anywhere impoverished or inefficient, for what I have said of the importance to the nation of the Pennsylvania Railroad System applies, in a varying degree, to all railroads.

WHAT WOULD THE RAILROADS MEAN IN TIME OF WAR?

If the railroads have meant so much to France, England and Germany at war, with their comparatively small areas and relatively short distances, what would they mean to this country, under a like

circumstance, with great cities 3,000 miles apart, with a population of over 100,000,000 scattered over 2,974,000 square miles of territory and confronted with the immediate necessity of greatly increasing the industrial output and transporting the products to the place of utilization, of developing untouched and remote resources and of organizing and mobilizing large armies?

If our railroads are ever called upon to assist in the nation's defense, what would it be worth to the American people to have allowed these railroads the necessary funds required for the needed double and quadruple tracking, extension of lines, modernizing of all equipment, and the enlargement of the terminal facilities necessary to prevent congestion?

What would happen to America if its railroad transportation system broke down when called upon by the people of the country to aid in her defense?

These are pertinent questions.

Next, then, to an adequate army and navy, if not indeed of equal importance, is the condition of the railroads of the United States as a factor in national preparedness. Only railroads of the highest efficiency can truly unify the country and keep its resources of men, money and materials in a liquid and mobile state. As a military precaution, if for no other reason, it would be in the highest degree wise and profitable for the American people to see to it that their railroads have sufficient financial resources to be able to serve this end properly; and that the Federal and State Governments accord them treatment which will insure their healthy growth at all times.

A STATISTICAL COMPARISON BETWEEN AMERICAN AND GERMAN RAILWAYS

By W. A. SCHULZE, PRIVY COUNSELLOR OF FINANCE, BERLIN.*

It may be stated as a rather singular fact that the railroads of the United States of America, although they had a total length of 249,852 English miles in 1912, exceeding almost sevenfold the 37,757 miles of German railways, had only one and one-half times the passenger traffic but about six times the freight traffic of German roads; yet the net revenue attained by the American railroads since 1908 has suffered a continued decline, until, figured per mile, in 1912, it was less than half as great (\$3,003 against \$7,137) as that earned by German railways. This is true, moreover, not only for the entire American system, but in somewhat lesser degree for the better situated railroads of the northeastern group of states, whose net has been reduced so greatly through the high taxes paid to individual states and to municipalities, that in 1912 it was only about two-thirds the net of German roads per mile (\$4,945 against \$7,137).

From the standpoint of the science of transportation, it will be of value to compare the railway conditions in America with those in Germany in recent years, before the outbreak of the present world war. * * * American statistics give most of the returns in two forms, once combined for the entire Union, and again divided for the separate "districts," namely the eastern district, which comprises the northeastern states from the Atlantic Ocean to Lake Michigan and the Mississippi; the southern district, comprising the southeastern states, and the western district, taking in the western states. The eastern district is by far the richest portion of the Union in traffic, since it alone contains almost half the entire population as well as half the entire passenger and freight traffic, yet takes up in area only one-eighth the Union. It seems, therefore, advisable to compare also this eastern district with the returns for the German railways in the years 1908 to 1912. * * *

*Translated and annotated for the Library by Francis A. Bonner, from "*Zeitung des Vereins Deutscher Eisenbahnverwaltungen*" Numbers 46 and 58, 1915.

The entire system of railways in the United States in 1912 had an operating length of 249,852 miles; since the population was 95,545,336 and the area was 2,973,890 square miles, there were 382.4 inhabitants and 11.90 square miles to every mile operated. The railroads of the eastern territory, with its 42,560,622 inhabitants and 328,361 square miles, had an operating length of 64,284 miles and on the average 662.1 inhabitants and 5.11 square miles per mile of road. Against this the standard gauge railways of the German Empire, with its 66,145,982 inhabitants and 208,905 square miles, had an operating length of 37,757 miles, (of which 35,541 was State and 2,216 was private mileage) equaling 1,752 inhabitants and 5.54 square miles per mile operated. The network of German railways was thus about equally thick compared with area but had almost three times as dense a population as the roads in the eastern district of the United States.

United States railways are entirely private. Of the German standard gauge roads only 5% are private, 95% being government. The entire operated mileages compare as follows:

AMERICA	GERMANY
1908 230,494 miles.	35,624 miles.
1912 249,852 miles.	37,757 miles.

Since Germany has a greater prevalence of second or more tracks, the entire trackage was:

AMERICA	GERMANY
1908 254,193	49,496
1912 279,219 ¹	53,148

The invested capital of American railroads amounted to:

STOCKS	BONDS
1908 \$7,373,210,000	\$ 9,394,330,000
1912 8,622,400,000	11,130,130,000

¹This is main line trackage. With sidings and yard tracks United States trackage in 1908 was 333,646 and in 1912 was 371,238 miles.

and hence for the two countries the total capital compares thus :

	AMERICA ²	GERMANY
1908	\$16,767,540,000	\$3,872,870,000
1912	19,752,530,000	4,394,410,000

or figured per mile of operated length :

1908	\$72,744 ²	\$108,715
1912	79,058	116,457

and per mile of track :

1908	\$65,965 ²	\$78,240
1912	70,747	82,679

The entire operating revenues of the two systems were :

	AMERICA	GERMANY
1908	\$2,394,780,000	\$643,300,000
1912	2,842,690,000	827,470,000

while the operating expenses were :

1908	\$1,670,400,000	\$473,500,000
1912	1,972,420,000	558,170,000

The net revenues, that is the excess of revenues over expenses, thus compared as follows :

1908	\$724,380,000	\$169,800,000
1912	870,270,000	269,300,000

as a result of which the return upon total capital invested was :

1908	4.32%	4.51%
1912	4.41%	6.29%

In reality however this return upon capital in America was considerably smaller, since in the figures above given for operating expenses the taxes to states and municipalities paid by American railroads are not included, while the taxes and municipal payments of German roads are included in operating expenses. These taxes and public payments in amount and in percentage to gross revenues of the railroads were :

²Gross capital of American railways with all the duplications of incorporate holdings, has been given in each instance by the author. Net capital outstanding in the hands of the public in 1908 was \$12,833,591,510 and in 1912 \$15,087,600,650. This gives net capital per mile in 1908 of only \$57,201 and in 1912 only \$63,535, while per mile of track including yard track and sidings net capital was only \$38,464 in 1908 and \$41,204 in 1912.

	AMERICA ²	GERMANY ³
1908	\$ 84,599,992 or 3.53%	\$4,738,213 or 0.74%
1912	120,091,534 or 4.22%	7,876,949 or 0.95%

Figured per mile of line these taxes amounted to:

	AMERICA	GERMANY
1908	\$382	\$ 131.40
1912	481	208.80

Through this taxation of American railroads the returns on capital invested as given above are reduced in 1908 by 0.51 points and in 1912 by 0.61 points so that as actual returns upon the capital only the following percentage comparisons would be proper:

	AMERICA ⁴	GERMANY
1908	3.81%	4.51%
1912	3.80%	6.29%

For the five years, 1908 to 1912, the aggregate return in America was only 20.19% against 28.04% in Germany, or, averaged per year, 4.04% against 5.61%. Thus America presents a return 38% less favorable than Germany's. It is noteworthy, too, that this performance for America in comparison with Germany is becoming worse year after year, for the return achieved by American roads was less favorable than the German in each year 1908 to 1912 by 18.4; 23.8; 28.0; 60.7, and 65.5%.

Figured per mile of line the actual net of the railroads was:

	AMERICA	GERMANY
1908	\$2,732	\$4,766
1912	3,003	7,137

the German net per mile thus more than doubling the American in the last year.

³It is interesting to note that in 1912 the German government railroads, as revealed by the yearly official statistics, paid only 0.94% of their revenues in taxes while the private roads paid 1.40% of theirs. At the German average rate of 0.95% for all roads, taxation of United States railroads would have amounted to only \$27,000,000 instead of over \$120,000,000 actually paid. There would thus have been some \$93,000,000 saved for net.

⁴The rate of return on American capital in each case has been figured on gross capital, including all duplications. On net capital, the return after taxes in 1908 was 4.98% and in 1912, 4.97%.

Moreover it must be considered that in America the net returns which the separate railroad companies earned, according to the dividend rates paid, vary from each other in a remarkable degree, if one compares them with the rates earned by the German state railways and the German private roads. In Germany these returns in percentage to the invested capital were:

	1908	1909	1910	1911	1912
On state railroads.....	4.52	5.10	5.76	6.45	6.32
On private railroads.....	4.29	4.45	4.83	4.93	5.12
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	4.51	5.09	5.74	6.41	6.29
	* * *	* * *			

The financial results of the railroads in the most important and richest traffic territory of the United States, namely the eastern district, have been somewhat less unfavorable than in the case of American roads as a whole as shown above. The mileages of these railroads were:

OPERATING LENGTH	TRACKAGE
1911 64,038 miles	82,655 miles
1912 64,284 miles	83,593 miles

The gross capital was:

TOTAL	PER MILE OF LINE
1911 \$7,261,150,000	\$87,850
1912 7,402,010,000	88,550

and the earnings were:

	REVENUES	EXPENSES	NETS
1911	\$1,212,470,000	\$854,020,000	\$358,450,000
1912	1,248,100,000	878,800,000	369,300,000

Taxes and municipal payments of these railroads, furthermore, in amount and percentage of gross revenues as well as per mile of line were:

1911	\$46,350,019 or 3.82% and \$724 per mile.
1912	51,455,928 or 4.12% and 801 per mile.

as a result of which the net is reduced as follows:

TOTAL	PER MILE
1911 \$312,100,000	\$4,874
1912 317,850,000	4,945

Even in this territory there is shown thus a return on gross railroad capital in 1912 of only 4.30%. In the case of the German railroads by contrast the returns in the two years as already shown were 6.41% and 6.29%. Net per mile in America for the two years was \$4,874 and \$4,945 against \$7,146 and \$7,137 for the German railroads, an excess for the latter of 47 and 44% respectively. Taxes paid by the American railroads in 1911 and 1912 represented 3.82 and 4.12% of gross revenues, whereas in a case of German roads public payments were only a trifle more than one quarter of that, in other words only 0.80 and 0.95% of gross revenues.

All these great inequalities in the returns of American and German railroads lead to the conclusion that there must be considerable contrasts as well in their tariffs, all the more so since their summed up results show that taken as a whole, the average fare per passenger mile or per passenger kilometer in America is twice as great as in Germany, whereas, the average revenue per ton mile or ton kilometer for freight in America is only half as great as that received in Germany. Into the question of these contrasts in passenger and freight tariffs we shall go in a later article.

PASSENGER AND FREIGHT TRAFFIC IN AMERICA AND GERMANY.⁵

For a comparison of the performance of American and German railroads as to passenger and freight rates it seems advisable not to take as a basis American roads as a whole, but rather those of the most important district, namely the eastern territory. With 64,284 miles the railroads of this district showed the following results in passenger traffic in 1912: passenger revenue, \$281,602,503 or \$4,381 per mile; 15,745,175,861 passengers carried one mile, or 257,255 passenger miles per mile of road; an average journey for each passenger of 25.64 miles; total number of passengers carried, 619,385,412, or 9,635 passengers per mile; an average revenue per passenger of 45.5 cents, and per passenger mile of 1,782 cents.

With 37,757 miles the German railroads had the following results in passenger traffic in 1912: passenger revenue, \$224,719,558

⁵The argument advanced by the author is that high passenger rates in the United States have tended to restrict American passenger traffic. He makes no allowance, however, for the great difference in density of population, although he is careful, when considering freight traffic, to emphasize the advantage of American railroads in volume of freight tonnage as a reason for our lower freight rates. The difference in density of population, money value and other factors offsetting the higher American passenger rate are pointed out later in the very fair notation by Editor von Muehlenfels of the "*Zeitung*."

or \$6,148 per mile; 24,818,333,020 passengers carried one mile or 678,385⁶ passenger miles per mile of line; an average journey of 14.23 miles; total number of passengers carried, 1,743,535,918, an average of 46,177⁶ passengers per mile. Their average revenues were 12.86 cents per passenger and 0.91 cents per passenger mile.

From this it may be seen that the average fare per passenger mile in America is nearly double that in Germany (1.782 cents against 0.910 cent), while the average fare per passenger journey was about 3½ times as high (45.5 cents against 12.86 cents), since the average journey per passenger in America was 25.64 miles against only 14.23 miles in Germany. In spite of payment of these higher average fares in America the average passenger revenues per mile there are only \$4,381, in contrast to Germany's \$6,148; the number of passengers carried per mile, furthermore, in America is only 9,635 against 46,177 in Germany while the passenger miles are only 257,255 per mile of line in America against 678,385 in Germany. The development of passenger traffic on American railroads since 1908 has been much less marked and therefore much less profitable than in Germany. For the two countries the following passenger revenue per mile of line and average fare per passenger mile can be made:

	AMERICA	GERMANY
1908	\$4,138 and 1.750 cent	\$5,128 and 0.929 cent
1912	4,381 and 1.782 cent	6,148 and 0.901 cent ⁷

As may be seen from this the average receipts from passenger traffic of American roads per mile of line rose between 1908 and 1912 only \$243, or 5.85% while Germany rose \$1,020 or 19.89%. The average revenue per passenger mile on the other hand, rose in America from 1.750 cent in 1908⁸, to 1.782 cent in 1912, or 1.83%

⁶The author gives 421,619 passenger miles per mile of line for Germany which is a mathematical error in transposing the figures, 678,385 being correct. Likewise through another error he gives 17,836 as the number of passengers per mile, the correct figure, 46,177, having been used above.

⁷The author in error has taken the 1911 figure for average passenger fare per kilometer (2.35 pfennig) instead of 2.37 pfennig, the proper one for 1912. This gives a 1912 average of 0.910 cent instead of 0.901 cent, the proper figure having been used previously herein.

⁸The comparison is somewhat unfair for American roads since the 1908 average was a low point both in the eastern district and in the United States as a whole. The 1912 average of 1.782 cent in the East is identical with the average for 1907 and is actually lower than the averages for preceding years. Had the author taken these years he would have shown a decrease for America also.

while in Germany the rate fell from 0.920 cent to 0.901 cent⁹ or 2.65%.⁹

The average journey of passengers in America in 1908 was 24.77 miles and in 1912, 25.64 miles against Germany's average in the two years of only 14.13 and 14.23 miles. From these figures one may infer that American passenger travel has been extraordinarily increased in price and burdened by much too high passenger fares for all short distances, and that the less prosperous portion of the public, especially working people have been just about forced to see themselves obliged to make their short journeys not by railroad but with the cheaper means of transportation, the street cars, steamships, on bicycles or on foot.¹⁰

And to this must be added that, taken as a whole, in America express trains and ordinary trains do not travel in a single instance faster or more frequently than on German railroads; on the contrary—if one leaves out the extraordinarily heavy passenger business on the two railroads between the great cities of New York and Philadelphia—on the most important roads in Germany for the most part there are maintained more and swifter fast trains and passenger trains. Way-stations for boarding and leaving the trains, in particular, follow each other much more closely in Germany, and therefore trains can be used much more easily for shorter journeys.

⁹As already shown the average of 0.901 cent is incorrect for 1912 and should be 0.910 cent, which would be a reduction of only 1.09%. On what basis of computation the author determines the 2.65% reduction does not appear, as it is incorrect on either basis.

¹⁰Note by the German editor: We cannot acquiesce in this view of the author. The fact that the average passenger fare in the United States, and especially in the eastern district, is higher than in Germany is shown anew indisputably by the above statistical demonstration; but the claim that local travel is burdened by much too high passenger fares, and the inferences drawn therefrom, are not to the point. Genuinely local travel does not make use, for the most part, of the railroads here in question, but avails itself of the numberless street railroads, elevated roads, subways, suburban railways and all the other things that minor roads are called there. The variations of class in which the travel takes place, also have been given no consideration by the author. Besides the general class [day coach] there are numerous very widely used special classes arising from the institution of palace cars and Pullman cars as well as dining cars, for which high premiums are paid.¹¹ Furthermore it is not to be overlooked that the value of money in America in general is very much lower than in Germany so that the American average fare in reality is hardly higher than the German. This reveals itself very clearly in the well known fact that the single fare on American street railways, subways and elevated roads is universally ten cents, that is, 42 pfennig, or four times the single fare on German street railroads.¹² Yet it would be false to speak of an over-

The fact may be cited especially that for every inhabitant in the eastern district of the United States in 1908 there was only 14.88 railway journeys of 24.77 miles each; but in 1912, although the population had increased about 16%, there were only 14.55 journeys per inhabitant, each 25.64 miles long.¹³ In Germany, however, there were 21.62 journeys per inhabitant in 1908, each 14.13 miles long, whereas in 1912 there were 26.36 journeys averaging 14.23 miles long. In the third and fourth classes alone in 1908 there were carried 1,251,000,000 people (including the military) at an average fare of only 0.82 cent¹⁴ per mile, each an average of 13.62 miles; the figures for 1912 reached 1,609,000,000, also at 0.82 cent per mile, each an average of 13.75 miles: so that in the two lowest classes, utilized principally by the less prosperous inhabitants, 1912 showed a gain of 358,000,000 passengers or 28% over 1908.

burdening of American street car patrons through too high fares. It is a fact that the country traversed by American railroads, in spite of large and heavily populated cities, is much more thinly inhabited than is Germany. Germany has a population per square kilometer of 120 souls, against which the state of New York itself has only 69, Pennsylvania only 66, Delaware only 33, Illinois (in spite of Chicago) only 38; only the states of Massachusetts and Rhode Island have a somewhat heavier average population than Germany, New Jersey being about equal. The average population of the entire United States equals only 9.8 inhabitants per square kilometer. These conditions must be kept in mind also in connection with the ensuing statements of the author, when he—in our opinion—unjustly calls the passenger facilities of American railroads scanty. The conditions over there are much different!

¹¹In his fairness the German editor here leans over backward and falls into error, for these "premiums" paid for palace and sleeping car accommodations, of course, do not enter into the average revenue per passenger reported in railway statistics. On this question the editor probably would have done better had he pointed out the immense discrepancy between classes of American and German passenger travel, the former being practically all first class, while in Germany only 0.1% of the travel is first class, 7.5% being second class, while 42.0% is third class and 49.2% is fourth class, the remaining 1.2% being military. Second and third classes together comprised therefore 91% of the travel in Germany, with their inferior accommodations and lower rates, naturally pulling down the German average tremendously. First class travel alone in Germany paid 2.93 cents per mile in 1912 (50% more than the 2 cents fares in many of our states) to which "premiums" must also be added for sleeping car accommodation.—F. A. B.

¹²This, of course, is erroneous. The universal single fare on American street railways is 5 cents (21 pfennig) or only twice the 10 pfennig fare of Berlin, Munich and other German cities. For longer distances in those cities 20 pfennig, practically the 5 cents of our own traction systems, is charged.—F. A. B.

¹³Some allowance should be given eastern United States since against its increase of 16% in population in four years Germany's population in the same time increased less than 6%, about 1-3 as fast, so that a given increase in total journeys would result in a greater increase in journeys per inhabitant.

Time, students' and workmen's weekly tickets as well as workmen's round-trip tickets comprised a full third of this journey in third and fourth class on the Prussian-Hessian state railways; to be exact, 317,000,000 in 1908 and 442,000,000 in 1912, an increase of 125,000,000 or 39% in four years, who paid an average of only 0.34 cent and 0.36 cent¹⁴ per mile. How scanty appear to be the figures for the entire United States with a mileage seven times as great as Germany's, since in 1912 American roads hauled only 998,000,000¹⁵ persons, a distance of 33.18 miles each, against 890,000,000 in 1908, an average distance of 32.86 miles! There was accordingly in the four years a growth of 108,000,000, or 12%.

Freight traffic on American railways displays in rates per ton mile the direct antithesis to the passenger fare comparison with German tariffs. The American average rate per ton mile in 1912 was only about half as high as the German, but on the other hand the number of ton miles in America was correspondingly much larger.

According to statistics for 1912 freight traffic in the eastern district of the United States (with 64,284 miles of road) and on the German railroads (with 37,591 miles) compared as follows:

Turning to the development of freight traffic since 1908 the average freight revenues per mile of road and per ton mile may be compared as follows:

	America	Germany
No. of tons carried (U. S. ton= 908 metric ton)	1,108,075,722	674,433,620
Ton miles, total	134,947,240,000	41,716,880,000
Ton miles, per mile of line	2,131,165	1,109,758
Average haul, miles	121.87	61.85
Freight revenue, total	\$873,338,982	\$519,227,398
Freight revenue, per mile	13,585	13,902
Average revenue, per ton	78.9 cents	76.9 cents
Average rate, per ton mile	0.647 cents	1.245 cents

Turning to the development of freight traffic since 1908 the average freight revenues per mile of road and per ton mile may be compared as follows:

¹⁴The averages of 0.82 cent per mile in third and fourth class travel and of 0.34 cent and 0.36 cent for time tickets, students' tickets and workmen's weekly tickets (the commutation tickets of German railways), do not compare over-favorably with our own commutation rates of from 1 cent to 1-3 cent per mile prevailing out of any of our large cities. The number annually carried on these rates in five cities alone is not far under 175,000,000 persons per year.

¹⁵Official figures show 1,004,000,000 passengers in 1912, a gain of 114,000,000 or 12.8% over 1908.

America	Germany
1908 \$12,201 per mile, 0.650c per ton mile	\$11,673 per mile, 1.273c per ton mile
1909 11,978 per mile, 0.652c per ton mile	12,119 per mile, 1.269c per ton mile
1910 13,893 per mile, 0.645c per ton mile	12,829 per mile, 1.277c per ton mile
1911 13,212 per mile, 0.646c per ton mile	13,751 per mile, 1.258c per ton mile
1912 13,585 per mile, 0.647c per ton mile	13,902 per mile, 1.245c per ton mile

The freight revenues per mile received by American railroads, according to these figures, were rather unsteady between 1908 and 1912; in Germany on the other hand they went steadily higher from year to year. In Germany, for instance, 1911 and 1912 brought the highest figures per mile, whereas America attained the highest in 1910. Compared with 1908 the freight revenues per mile in America rose \$1,384, or 11.34% against a growth of \$2,229, or 19.10% in Germany. The average revenue per ton mile in America fell only 0.46% ¹⁶ whereas in Germany they fell 2.20%.

It is noteworthy moreover, that in 1911 and in 1912 the freight revenues per mile in Germany were \$539 and \$317 higher than in America, yet the ton miles carried on American railways per mile in 1912 were 2,131,165, against 1,109,758 on German roads, 47% less. The average revenue per ton in America was 78.9 cents and in Germany almost the same, or 76.9 cents. The average revenue per ton mile on the contrary was only 0.647 cents in America, whereas in Germany it was almost double, 1.245 cents.

For American railways as a whole (with 249,852 miles) the average revenue per ton and per ton mile was somewhat higher, for in 1912 there were carried 1,844,980,000 tons and 264,080,740,000 ton miles having a revenue of \$1,968,598,630, which brings an average revenue per ton of \$1.066 and per ton mile of 0.744 cents. The average haul was 143.44 miles against 121.87 miles for the eastern district alone.

Compared with American average revenues per ton mile and their ton mile performance per mile of line, the German railroads evidently not only perform a smaller task than do the American roads but they also receive for their performance, figuring numerically, much higher freight rates per ton mile. Yet a judgment of the tariffs in the two countries cannot be arrived at so simply, since it is very difficult to weigh together as to their effect on revenue

¹⁶Here again the comparison is unfair to American railways since both as a whole and in the eastern district alone the 1908 ton mile revenue was at a low point, so rendering smaller the recession shown for 1912. A totally different showing is made if other years are taken. The 1912 average on eastern roads was 1.82% below 1907; 3.72% below 1905, and 6.23% below 1904 against Germany's contractions for the same years of only 1.65%, 2.46% and 2.72%.

the great differences which exist between the freight rates based on distance and the classification of freight in America and in Germany; and since in America freight rates for each railway are fixed particularly according to the conditions of the locality or the individual state, as well as by the competition against other shippers, which must be maintained, while under several special circumstances, as in the case of contests of interested parties with the railroad, rates are approved by the railroad commissions only after proof of their exact propriety and reasonableness.

Since freight tariffs are graded in America according to distances, whereas in Germany freight rates are on a per kilometer basis (with the exception of the so-called "adjustable tariff"), it is therefore not to be considered as impossible that the greater part of freight shipments for short distances in America are on rates equally high with those in Germany, and that the low average per ton mile in America for the most part is explained by the many shipments of great weight over long distances.¹⁷ German railways, it must be considered furthermore, in spite of their higher freight rates, have had since 1908 a considerably larger growth in traffic than have American roads with all their apparently much lower freight rates. The ton kilometers of German roads in 1908 were 45,352,000,000; in 1912 they were 60,947,000,000 or 34% more; in the same time American roads in the eastern district rose from 108,302,000,000 ton miles in 1908 to 134,947,000,000 in 1912, only 25%. Higher freight rates in Germany thus cannot have been in any way injurious to the healthy development of freight traffic, while the much lower rates per ton mile in America have not been able to induce as vigorous a growth in traffic.¹⁸

¹⁷This might be proved or disproved as one varied the commodity shipped, for Germany has fostered certain industries and her export trade by exceptionally low rates while recuperating on other commodities with high rates. The longer haul in America is more than offset as an advantage by the fact that money in Germany has double the value prevailing here, wages and prices alike being about one-half as high. Thus freight rates in Germany instead of being absolutely double those in America are rather four times as high in relation to wages or the prices of commodities shipped, that is, the cost of living.

¹⁸The author, it will be remembered, blamed high American passenger fares for reducing travel; low freight rates, however, he contends, do not help the freight traffic, while high rates in Germany do not hinder it! The truth may be that the measure of the freight rate in any event (excepting only the question of relationship and effect on competition) is too insignificant to influence the growth of traffic as a whole, even were United States rates nearer the high rates of the German. The tonnage grows with the growth of the country.

American statistics give no information as to what tonnage is hauled under the distinct tariff classes or what rates are paid for these either in toto or per ton mile; German statistics give this information for the 15 classes of freight. At the same time the American figures show what revenue has been received in all and per ton mile for certain kinds of freight, and further the average revenue per ton and per ton mile earned by each of a large number of railroad companies. For instance, according to the 1911 report of the Interstate Commerce Commission 40,330,000 tons of grain, 12,200,000 tons of live stock and 5,330,000 tons of cotton were hauled in the three districts at the following very diverse average rates per ton mile:

	GRAIN	LIVE STOCK	COTTON
Eastern	0.409 cents	0.789 cents	0.542 cents
Southern	0.684 cents	1.490 cents	1.798 cents
Western	0.781 cents	1.386 cents	1.987 cents
Total	0.626 cents	1.214 cents	1.716 cents

For seventy-two of the more important railroads of the eastern district (those which have an annual revenue of \$1,000,000 or more) more detailed returns on traffic are made from which it may be seen that there are even larger variations in the average freight revenues earned by the individual companies. Of these seventy-two companies, three having the lowest averages reported 0.286, 0.369 and 0.421 cents per ton mile; six companies reported averages from 0.437 to 0.542 cents; fifty-five from 0.580 to 1.158 cents; six companies from 1.174 to 2.055 cents and two companies the highest averages of 2.308 and 3.276 cents.

Equally great differences do not exist between the lowest and highest averages for the more important railroads of Germany,¹⁹ since the individual German roads in 1911 reported per ton mile the following average revenues:

Prussia-Hesse	1.226 cents
Alsace-Lorraine	1.152 cents
Bavaria	1.291 cents

¹⁹Naturally, since comparing the eight German state systems as wholes one would not expect to find such contrasts as when comparing individual American roads. Had the author taken the trouble to wander a few inches down the page in the German official report, to the rates for individual small private railways, he would have found contrasts violent enough to satisfy the most exacting. In 1913 these roads reported average revenues per ton mile varying from 1.09 cents to 12.31 cents.

Saxony	1.601 cents
Wurtemberg	1.521 cents
Baden	1.364 cents
Mecklenburg	1.478 cents
Oldenburg	1.298 cents
Total	1.253 cents

From these figures comparisons may be made between the lowest and highest averages of freight revenues:

1. Lowest rates of 0.286, 0.369 and 0.421 cents for three American companies and of 1.152 and 1.226 cents for two German divisions, Alsace-Lorraine and Prussia-Hesse.

2. Highest rates of 3.276, 2.308 and 2.055 cents²⁰ for three American companies and of 1.521 and 1.601 cents for two German railways, Wurtemberg and Saxony.

3. Medium rates of 0.580 to 1.858 cents for sixty-six American companies and of 1.291 and 1.478 cents for the state roads of Bavaria, Baden, Mecklenburg and Oldenburg.

It must be remembered, moreover, in connection with the average of 1.253 cents per ton mile for German state railways, that the greater portion of all German freight traffic is hauled at considerably lower rates, if one takes as a basis the average revenues which accrue on the fifteen separate classes of traffic. All fifteen classes in 1911 amounted to 570,740,000 tons or 35,397,400,000 ton miles, giving an average haul of sixty-two miles. The freight revenue from all was \$491,522,703, or 86 cents per ton and 1.258 cents per ton mile. This was divided as follows:

1. Under the two cheapest tariff classes (Special Tariff III and Exceptional Tariff for car loads of 10 tons and over) 440,310,000 tons were hauled 27,254,586,200 ton miles, giving an average haul of 61.9 miles. The revenue was \$278,668,834, an average of 63 cents per ton and 0.926 cents per ton mile.

2. Under the other 13 tariff classes there were hauled 130,420,000 tons a distance of 8,142,813,400 ton miles, an average haul of 62.15 miles. The revenue was \$212,855,869, an average of \$1.63 per ton and 2.62 cents per ton mile.

²⁰These were the figures reported respectively by the Long Island Railroad, Atlantic City Railroad and West Jersey and Sea Shore, all small roads of high class freight traffic.

Fully 77%, it is thus seen, of the entire German freight traffic was hauled at an average rate of 0.926 cents²¹ per ton mile, each ton an average of 62.15 English miles. American railways of the eastern district in 1911 hauled 1,068,350,000 tons a distance of 130,834,000,000 ton miles, an average haul of 122.68 miles. The freight revenue was \$846,102,280, an average of 79 cents per ton or 0.646 cents per ton mile.

From this last comparison it may be concluded that to answer the question whether and to what degree the freight rates on American and German railroads correspond to the services, one must weigh not only the average revenue per ton and per ton mile, but also the average distance the ton is hauled and the average load per freight train. In this respect without doubt American railroads can rely upon a great advantage over German railways, for in 1911 and 1912 the average distances per ton were 122.68 and 121.87 English miles, or double that of the German roads. And so far as concerns the amount of freight to be shipped, the American roads (eastern district) in 1911 reported 279,140,000 train miles and 130,834,000,000 ton miles; and in 1912, 271,560,000 train miles and 134,947,000,000 ton miles; so that each freight train hauled on the average a load in these years of 468 and 496 American tons, equaling 425 and 450 German tons. On German railroads, freight trains hauled an average load of only 214.6 and 218.0 tons in these years.²² German railroads have afforded an advantage in the shipping of freight in so far as the number of freight trains operated by them is relatively double that on American railroads, and the German freight trains with their much lighter average weight are operated on swifter schedules and are available for a larger number of small stations between large cities.

²¹This "low" average for the two bottom-most classes of German freight, it should be noted, compares with 0.646 cent per ton mile for all classes of freight traffic in eastern United States. In comparing freight rates one of the author's chief aims has been to show that some American roads receive a higher average per ton mile than the German average as a whole, but the true comparison, of course, is seen in the above averages for both countries.

²²This advantage of traffic density and train loading the author did not see fit to mention, it will be remembered, as a reason for Germany's lower passenger rates.

GOVERNMENT REGULATION AND OUR TRANSPORTATION SYSTEMS*

BY OSCAR W. UNDERWOOD,
United States Senator from Alabama.

There is no more important question now pending before the American people that awaits proper solution than the settlement along just and economic lines of the vexed problems of transportation.

We have recently solved the banking and currency problems of the country by passing legislation that seems to have met with almost universal approbation. This legislation was only accomplished after full and careful investigation by a commission appointed by the president of the United States.

The president of the United States in his recent message to Congress has recommended that a commission should be appointed to give a thorough investigation to all the problems that confront us in the field of transportation.

WHAT PRESIDENT'S RECOMMENDATION MEANS.

As I understand the purpose of this investigation, it is not to hold an inquest on what has happened in the past. If errors have been committed or injuries have been done, that is a question for the courts and not a question of legislation. The real purpose to be accomplished by the investigation is to give an opportunity for all concerned—the farmer, the merchant, those directly engaged in transportation, the Interstate Commerce Commission and the railroad managers to appear before a committee of Congress and state their views in reference to the solution of this great problem with the view in mind that in the counsel of many we shall find wisdom to guide our legislative course.

You may ask me, why the need of an investigation at all? There may be those present who believe that the transportation companies of the United States are engaged in private business and that they should not be interfered with by government regulation. To them

*Extracts from an address delivered at the dinner of the American Electric Railway Association and the American Electric Railway Manufacturers' Association at Chicago, Friday evening, February 4, 1916.

I can only say that the transportation of the commerce of this country by the carriers is so closely allied to the healthy growth and the economic business development of the nation that its regulation was inevitable from the beginning.

More than that, revolutions do not move backward, and if we are unable to successfully and fairly regulate the transportation systems of America, the country will demand that we go forward and the next step ahead is the government ownership of the railroad lines. I think a step in that direction would be most unfortunate. It would lead to many evils that we dream not of today; to avoid which, we must work out a satisfactory system of government regulation, both for those engaged in the shipment of freights, and those who have their money invested in the means of transportation. It is, therefore, a matter of great importance that we should earnestly endeavor to reach a fair and reasonable solution of the problem of regulation at as early a date as possible.

It has been said a nation is an organism, not unlike a living individual, wherein the channels of transportation are arteries and veins; if the flow in these be sluggish, industrial disorders are indicated, if it be clogged industrial diseases follow, if it be stopped, national disaster results. Something long has been, is, and will apparently continue to be wrong in the relation between the people and those who are engaged in the transportation business—something so wrong as at times to border on open hostilities. Drastic remedies spasmodically applied—and ill-considered and misapplied laws—have not reached but have rather more deeply rooted the essential wrong. The capital invested in transportation is about one-sixth of all the wealth of the country and about one-twelfth of all our people depend for their livelihood on the wages paid by transportation corporations. Seventeen thousand million dollars of the people's savings are invested in transportation securities.

In almost all countries the railroad question is one of first importance and has been met in foreign lands either by government regulation or government ownership. In other countries the problem has not been as difficult of solution as in our own, due primarily to two causes. Our large population and vast natural resources located far inland and at great distances from water transportation makes railroad carriage indispensable and industrial freedom could be guaranteed only by just regulation. The most serious difficulty

that has in the past prevented the solution of the problem here and is not met abroad, is a political one. Our system of government, under which the states possess certain inherent governmental rights and the federal government the great powers that were delegated to it in the beginning by the states, increases the difficulties and uncertainties that surround the problem before us.

DIVIDED AUTHORITY OVER RAILROADS.

It has been said that "No man can serve two masters," and under the regulation of today the transportation companies of America must obey the mandate of the federal government and at the same time the orders of each state through which the railroad line makes its way. All of the important railroad lines run through two or more states and are subject to different laws and regulations whenever a train crosses a state line. Go into the baggage car of an express train leaving Chicago and you will find a package that will reach its destination within the State of Illinois resting against a parcel whose destination is beyond the state line. Consider for a moment that the one package is subject to the rule of one master and the other must obey the mandate of at least three masters. Our courts have held that under the protection of the federal constitution the right of the railroads to charge rates that will produce a reasonable income on invested capital must be held inviolable; then how can we successfully determine what is a reasonable charge to be allowed for invested capital when you leave the determination to three or more sovereignties, each acting in its individual sphere?

Low rates and adequate facilities are demanded by the public, but the granting of one is often the denial of the other. Adequate facilities very often require the expenditure of large sums of money, but low rates prevent the accumulation of surplus capital and lessen the borrowing power of the roads. Without new railroad facilities our commerce cannot be expanded beyond our present limitation and trade has met a permanent barrier to its future development.

Two decades ago the great trunk lines of the country were able to borrow in this country and abroad the money necessary to increase their facilities at 4 and 4½% interest. Railroad bonds were considered by the investing public a first-class investment. How is it today? It is often with great difficulty that the best transportation systems in the United States are able to renew their old loans or

place new ones. Practically none of these loans can now be placed at 4% interest. A large majority of the bonds or notes sold in the last year earn above $5\frac{1}{2}\%$ interest and some are placed at rates as high as 7 and $7\frac{1}{2}\%$. What is the effect of this condition on the shipping public? It must be borne in mind that on every dollar that is earned by the transportation companies of America, 88 cents must go to pay wages, up-keep, and operating expenses, and only 12 cents goes to the capital account. It must also be borne in mind that there is no speculative enhancement in the value of the railroads that can be converted in the coffers of the company, because the property of the railroad is needed for its operation, and when the lines are once built the operation must continue in the interest of the public, and whatever their relative value may be does not affect the earning capacity of the company.

The sole source of revenue for the maintenance, development and expansion of our railroad systems must come from the men who ride on the trains as passengers and from the men who ship their goods over the railroad lines. If you increase the interest rates, the transportation companies must pay. In the end you must get the money to meet the increases either by the reduction of wages, the curtailment of facilities or by an additional charge on the passengers and shippers of freight.

INCREASE OF RATES MUST COME.

Practically speaking, the last alternative is the one we must adopt. Where a transportation company placed its bonds at 4% interest twenty years ago, and renews them today at 6%, so far as the public is concerned it is identically the same as if the company had increased its bonded indebtedness by one-half at the old rate of interest. And yet the public derives no benefit whatever from the increased charge.

It is, therefore, necessary in the solution of the problem before us in the interest of the public, even more so than in the interest of invested capital, that the credit of our transportation companies should be so good that they can secure the capital for their present maintenance and their future development at the lowest possible charge.

There may be many reasons to account for the changed status of railroad securities as investments in recent years. You may say that it is due to adverse legislation that has alarmed the investing

public. Whether the legislation has been unwise and ill-considered, or whether it has been just and fair, there can be no question that the investing public has become alarmed as to the solvency of railroad securities. It is also true that recent legislation of Congress exempting state and municipal bonds from national taxation has invited capital into that field of investment. Again it is true that the past generation regarded industrial securities as a more or less speculative investment. But the development of the great industries of our country today along safe and conservative lines has opened a field for the use of capital at higher rates of interest than the transportation companies of America can afford to pay, because there is no governmental limitation on the profits that can be made in industry and there is a hard and fast limitation, fixed by law, on the earning capacity of railroad securities.

The opening of new fields for investment has taken away from the transportation lines much of the market they enjoyed for their securities in the past. The rates of taxation have increased in every state of the union. Wages have gone up. The cost of equipment and supplies have greatly increased. If it had not been for economic management, many of the railroads that are running today would have been forced into the hands of receivers.

I think it can be said without expectation of contradiction that taken as a whole the transportation system of the United States, so far as performing its proper functions in the transportation of our freights to their ultimate markets and the carriage of passengers to their destination with safety and economy, is breaking down. What then must we do to solve the problem? To restore confidence in the minds of the investing public as to railroad securities? To insure rapid transportation of passengers and freights to their ultimate destination at reasonable rates, and to provide for the safety of transportation and the increased facilities that are necessary to transport the growing business of the nation? These results can not be accomplished by moving backward or divorcing our transportation system from government control. Nor can they be accomplished without great danger and great cost to the people by progressing to the ultimate step in advance and accepting government ownership of the transportation lines.

In my judgment, we must find the golden mean. We must solve the problem along lines of private ownership and government

regulation. We must consider the wisdom of substituting one master for forty-nine masters that regulate our commerce today. We must consider the wisdom of government supervision of the issuance of all securities by our transportation companies with the assurance to the public that new capital will be invested to secure proper facilities and used for legitimate purposes—not for speculation. We must assure the public that when they invest money in railroad securities which are supervised by government regulation we stand for a system of regulation which will allow the transportation companies to charge such rates for carriage as will enable them to promptly meet their interest account as well as their operating expenses. We must perfect a system of regulation that will recognize that the transportation lines of America are great public highways in which these people are as much interested as those who have invested their capital in them, that every shipper in America must have equal rights in the transportation of his goods along those highways; that rebates and discriminations of all kinds must be of the past and prohibited in the future, and we must recognize that the man who is willing to invest his money at a moderate rate of interest in railroad securities is not exploiting the public but is a public benefactor.

In my opinion an adequate transportation system means: 1. Roadbeds must be made more secure and more permanent; 2. Trackage must be enormously increased and many roads double tracked; 3. Safe equipment must be sufficient to satisfy requirements at any and all times; 4. Terminal facilities must be greatly improved and largely increased.

Stated briefly, then, our question is, whether the American people are willing to put up with an unsafe, inferior, and inadequate transportation system or have the intelligence to pay for one that will supply their needs and protect the lives of the people. The main trouble with the regulation of our railway system is that corporate law has been destructive, not constructive, has been piecemeal, not comprehensive.

To solve these problems, it is proposed that a committee of Congress shall give a thorough and complete hearing to all who desire to present their views. Let us hope that the result of the investigation will be productive of wise legislation—legislation that will build up and not destroy—legislation that will be helpful and not hurtful—legislation that will bring lasting and complete prosperity to the people of America.

A WISCONSIN VIEW OF THE RAILWAY SITUATION*

BY E. L. PHILIPP,

Governor of Wisconsin.

I am glad to be with you gentlemen as representing the State of Wisconsin and particularly as its chief executive. We have had our troubles up there. We were at one time one of the most conservative states in the Union. Many of you gentlemen of the older type who are here today remember when Wisconsin was always counted in with the column of conservative states in this country. Somehow, and for some reason, our people were carried away from that which they had believed so many years. Representations, half truths, and falsehoods bred suspicion among our people until for a time we stood at the head of the so-called reform states in the Union. We became recognized, and in a short space of time at that, as the beacon light of reform of this Union. We became the experimental station for all the untried theories of government that the fertile minds of the reformers could invent.

I speak as one of its citizens and as its governor, and I believe I speak for the majority of the people of Wisconsin when I say that we have gotten through with experiments. We do not wish any more of the untried theories of government. We are willing to pass that privilege to others.

I come to you, gentlemen, as an ex-railroad man and if there were no other evidence of a change of sentiment in the State of Wisconsin, the fact that an ex-railroad man can come to you today from Wisconsin as its governor, is in itself sufficient proof that there has been a tremendous change in the sentiments of the people of that great state. We have followed the isms. The isms have been preached and isms are being preached now. Incidentally during this long period of reform we have bred a set of politicians that never had anything to do but politics; that never made a dollar except by politics, and they are not all dead. They are working

*Address before Chicago Traffic Club, Nov. 18, 1915.

now; they are plowing over the same old ground, and I suppose in the due course of time we have got to go through the same fight that we went through a year ago.

Again referring to the matter of following isms, I am going to tell you a story, and I shall not be burdened by having to be quite as formal with you gentlemen whom I know so well as I would be with an audience of strange ladies.

I am going to tell you a story that originated in the agricultural section of Wisconsin. I heard it for the first time at a local station up in Wisconsin and no transportation man has any business to know it, so that I do not want you to say it is an old chestnut and that you have heard it before. This thing of running after all the reforms and new things that are offered, the untried things reminds me of a story which I think applies to the situation. A city fellow went to the country to spend the summer. He stopped with an old farmer. He arrived at the house, changed his clothes and went down to the farmer's yard. He saw some pigs in the yard and they were constantly running from one end of the yard to the other. He concluded, not knowing much about pigs, that these animals must be sick, so he went to see the farmer and reported to him, "Now, those pigs of yours are running from one end of the lot to the other; they must be sick. You had better go and see them." The old farmer had a very severe cold and had practically lost his voice, but he put on his coat and went to see what the trouble was. He went to the yard and looked at his pigs, and soon returned and said to the young fellow from the city, "Those pigs are not sick. Before I had this cold and I could talk, whenever I fed them I called them and they came, but now since I have got this sore throat I merely go and rap on the trough and then they come, and ever since then the blasted woodpeckers have kept those pigs running all the time."

The trouble with us in Wisconsin has been, and it has been so in many states as far as that goes, we have run after the woodpeckers too much. We have finally concluded, however, that we are going to stop that, and I believe I am safe in saying that a great majority of that great commonwealth stand for conservative and sane and sensible government at this time.

When I see a body of transportation men, and many of them gray, as I am myself becoming gray, I cannot help becoming somewhat reminiscent and I must do so on this occasion. I remember

something of the sentiment among people concerning railroads in earlier days. I remember when the Chicago & North Western was built through Wisconsin in the early '70s. At that time the people were anxious to get railroads. Everybody was land poor; everybody had land, but no transportation. The people in the particular section where I lived were willing to mortgage their homes and their farms in order to encourage the railroads. Further west I remember when the Dakotas and southern Minnesota were settled. I remember when I worked at Baraboo as a train dispatcher, that we had immigrant movables on every sidetrack from Baraboo to the end of the line out somewhere in Dakota. Hundreds, yes thousands of people who had their all in a box car, including their wives and their children, did not have the money to buy a meal. The railroad had to support them.

Now what was the reason for that? The reason for that was this: The railroad was built in advance of the settler and as soon as they could transport anything the railroad sought to bring in the settler. At that time the government of the United States, in a desire to encourage the building of roads—and it required encouragement, because practically all that these corporations had to borrow the money with which they could build a railroad was the security they had to offer in the form of land grants—the government was giving these land grants to the railroads. Why would a man of means at that time invest in a railroad running through a country where there was no population? It was a speculation pure and simple, and all they had to depend upon, all the security they had was the aid they got from the government and the hope that people might be encouraged to go to that country and settle it and finally make it a paying country.

I speak of these things to illustrate one point: Much is being said in opposition to railroads these days. Much has been said in the past fifteen years to encourage opposition to railroads, because of land grants, because of other concessions that were made by a former generation under entirely different circumstances; and, the wrong in that, gentlemen, is that the people today are asked to judge the acts of former generations by a present day standard.

However, it has been a fertile field for the theorist, and for the demagogue to go to the people and say, "Just see what the government gave these people, see the aid they received," and in that way

work up opposition. I am not here to speak against the regulation of railroads. I think the time came in our national existence when it had to be done. It had to be done in the interest of the people, and it had to be done as well in the interest of the railroads. It was better for the railroads themselves to have sane and sensible regulation in order that they might get rid of many of the abuses that had crept into the business.

If I may again be permitted to become reminiscent, I remember the time when I had greater authority on the Missouri Pacific Railroad over the question of rates than the president of that company has today. Of course that was not right, but it was the system at that time, it was the way business was done at that time, and it was the system that everybody used. There was nothing criminal or wrong about it; the law did not forbid it at that time. The time came, however, when the people demanded uniformity of rates; when the people demanded that there should be no discrimination either against person or place, and that system naturally had to be wiped out; and I believe I voice the sentiment of the railroad people of this country, I know I do of the men who had charge of the railroads at that time, when I say that no one, no person, no shipper, or the general public, appreciated the change any more than they did, because they, above all others, were very anxious indeed to get rid of a system that was unfair to the shippers and to their own stockholders as well.

A new era has come along in railroading. Legislation has been passed by the United States Congress, and practically every state in the Union, that has placed complete control of the transportation companies into the hands of the officers of the government. When that was done the public felt that a great work had been accomplished. People felt that the transportation questions of this country had been solved; that from that time on inequalities would be promptly adjusted, and that rates of transportation would be based entirely upon the principle of fairness and justice as between people and places and commodities. The agitators of that movement perhaps little understood the size of that undertaking. Inequalities existed then, it is true, but inequalities exist today, as every man must admit; and while I wish that transportation rates could be adjusted so that every shipper and every citizen who uses transportation might feel that his rate, whatever it may be, is entirely just as

between himself and the carrier, yet that undertaking is so great that I question whether it will ever be accomplished to the satisfaction of the people, much less of the transportation companies.

Think of it, gentlemen. Here is a vast body of transportation men, only a small part of the men who are engaged in that business, in the City of Chicago. While Chicago is a great city, a city of many and important industries, a great traffic center, nevertheless it is a small part of the whole when you take the entire country into account. The government, with a commission of seven men sitting in Washington, expects to control transportation, expects to answer to the people concerning every rate that is made and every complaint that is made. In other words, it claims to have the knowledge to revise the work of all you men and do it better than you yourselves were able to do it.

Now, it is all well and good to put that authority in the hands of a commission, but I say that the facilities which the government has so far furnished are entirely inadequate. If it is going to be the settled policy of this country to control the railroad rates as it is now doing, you cannot expect nine men to give a hearing to the business of this country and to adjust the rates that business must have, and to save it from ruin when this great body of transportation men, thousands of them, could not do it to the satisfaction of the public.

So I say, my friends, if we are going to continue to regulate rates, and I think we should; I am not opposed to it; the government should furnish the necessary facilities. The government should furnish the necessary men; it should furnish men of experience in sufficient number so as to make them of easy access to the people, so that the people's troubles can go to them at first hand, so that they can make a reasonable and fair adjustment promptly between the business of the people and the corporations.

We have a great deal of state regulation in this country. Practically every state in the Union has a railroad commission clothed with the power to do practically everything that the owners of the property can do. Now, there are several faults in state regulation. To begin with it can regulate only that business which is local to the state. That, of course, is interwoven with and interdependent upon interstate rates to an extent that it is practically impossible at times for the state to give the relief to the people that they deserve. How-

ever, there is a still greater fault, and that is this: each state under constitutional provisions has the power to regulate these corporations to suit itself. Each commission is proceeding in its own particular way, taking a piece here and a piece there. Each legislature is proceeding in its own particular way, legislating a million out of the railroad here and a million there, regardless of what legislatures of other states are doing, so that in the end when we come to sum up the result it is a question whether the railroads can exist in the long run under that system.

It does seem to me, therefore, that if we are going to have sane and sensible public regulation that the power to regulate should be placed in a single commission. You cannot operate a property successfully with six or seven general managers, each reaching into the treasury according to his own will. In the end you are going to destroy it. So I say, gentlemen, that I believe the time will come when the American people will see the folly of that system; that the states will be willing to give up their control over these corporations and that they will be willing to lodge it with the central government where it belongs, in order that there may be sane and sensible and practical regulation of these great properties.

The interests of the people in these properties are great. These properties are their institutions. I don't care where the stock is held, these railroads belong to the people, and it is just as important to the people themselves that they should be given a living, that they should be given the money with which to develop, that they should be given the necessary funds with which the property may be properly maintained, as it is to the owners themselves. A railroad is entitled to a reasonable return upon the money that is invested, with a sufficient sum for repairs and maintenance, so much as is necessary to keep the property in good condition; and whenever that is not done the people are hurting themselves, because the people use the railroads.

Remember, gentlemen, that transportation is not altogether a matter of price; it is a matter of service as well, and as we see it today, the cost of maintenance is reduced, the dividend is often paid out of the property itself; how long is it going to take until that system will spell ruin to the great transportation lines of this country?

The people of this country are fair; the people of this country mean to be honest; the people of this country do not wish to destroy

these properties; the people of this country wish to encourage railroad building wherever new roads are needed. It is largely a question of the people understanding the true facts, and there you transportation men can be of great importance to your property, you can be of great importance to the people themselves, by explaining away these many misstatements, this vast amount of misinformation that is put out daily by unscrupulous politicians, and sometimes by a less scrupulous press.

It is one of the misfortunes of this country that we have within our borders an element of politicians who are not particularly interested in the country, at least not nearly as much as they are in themselves; plausible, able, able to misrepresent any cause, if you please. This country has been the victim, as business has been the victim of misstatements, half truths and complete falsehoods until even the workingmen who have been led away by these misstatements have begun to realize that there isn't anything in that crowd; that after all if we wish to prosper we must prosper together, and that we cannot prosper singly or separately.

I stated before that despite all the legislation we have had upon the subject of transportation regulation, inequalities will exist, inequalities do exist, and I do not expect to live to see the day, despite all the care that you can possibly take, when they will not exist. The law had this virtue. It protected the people who are in local territory, at least to this extent, that the railroads could not squander their money at competitive points and put the burden of carrying the property upon the local people. In that respect the law was very useful. However, while the men who have advocated much of this legislation that we now have, have told the people that this was the great panacea for all the evils, you may have observed that the same element is organizing a campaign now against the commissions which they created.

I see it in my own state. I would not be surprised if the next political issue there would be against the railroad commission of Wisconsin. There is every evidence that it is going to be done. There is a propaganda there under the leadership of an alleged great statesman, who sees the same causes that existed in 1904, upon which he floated to greatness, and he is going to try the same ship again. But this time we have a commission, he cannot go out and agitate for a commission, and so of course he has got to go out and agitate against the commission.

You will find that a group of politicians will rise all over this country who will feel that there is another opportunity to get onto the wave of popularity and ride to Washington on it. I do not believe, however, that the sensible people of Wisconsin, nor do I believe that the sensible people of this country anywhere can again be led as they have been led in the past. The people demand justice and you railroad men must give them justice. They are entitled to it. It is their property, if you please, although you may have the ownership of it. They support it and they have a right to expect from you fair treatment, and if you give that you will find that the American people are fair enough and honest enough to appreciate it, and that they are not going to follow after these strange gods any more.

Of course, a man can talk upon this railroad question all day if he wants to. I don't know whether I can impress a body of railroad men very much. I don't know that I can make any converts to my side of this proposition. I think all of you agree with me that in dealing with the public, the public is entitled to the fairest treatment that you can give it. I think you will agree with me that in the matter of making rates, you have the right to charge whatever your service is worth, whatever will produce for your corporation a fair return upon the money that was honestly invested in it, and for the maintenance of the property as I said before, and no more. The people of this country will not and can not permit you to charge more. If you will carry your business on fairly and honestly, it does seem to me that your relations with the people should be such as will hereafter make you immune from the attacks of a lot of politicians who merely go out to work up the public, not in the interest of the public, but merely in their own interest.

I want to say just a word to the business element, the traffic managers who are among you. I am glad that a situation exists under which the men who ship and the men who do the transporting will meet together and sing together. There was a time when all those songs were written to the tune of per cents, but I am glad that it is not so now, and I know they are glad. There was one situation that was unfair; the system of paying rebates and the proposition of turning the rate-making power over to the government were thrown together. The demand for rate-making power had to be bolstered up and it was done by using the iniquities of the rebate. I need not tell you transportation men that those things

bore no relation to each other. The rebate system was stopped completely if it ever will be stopped, by the passage of the Elkins Act in 1903; and it required only the acts of the courts of this country to correct that evil if any existed after that. But the rate-making power was an entirely different proposition. The rebate system was well understood by the public, but the rate-making power was not so well understood. However, when you came to defend the system that was in effect at that time, it was the most difficult thing to do, and you will find it difficult now if you have got to go out and defend your rates.

Any glib-mouthed politician can rise in the State of Wisconsin today and make the general charge that the rates in the State of Wisconsin are all too high, and the man sitting in the back row with one suspender and a straw hat will throw his hat up in the air and say: "Yes, yes, that is the reason I am poor." Now, he doesn't know anything about freight rates, nor does he care to know, but he is made to believe that the railroad is carrying off everything that he earns, and it is the most difficult thing in the world to make that man believe that he is wrong; because, men who are not getting along in the world as well as they think they ought to, look for a cause. They seldom look at themselves; they are always casting their eyes elsewhere. So when you are attacked again, as you will be, at least I assume you will be, and if not now, then at some other time, you may expect to meet that situation and you will find the same difficult situation that you had in former years. You are on the defensive, and that is what the politician figures on. He figures that he can go out and make these charges and it is up to you to prove that it is a falsehood, and he knows it is a pretty difficult thing to do.

The way to overcome that is to cultivate the closest relations between the shipping public and yourselves. You can do it only by the rule of absolute justice, because men know as a rule when they are justly dealt with, and they will then be your friends and upon them you must rely to protect your property and theirs against that kind of politics.

You business men sometimes complain about legislation. I hear so much among business men about the idiocy of this or that member of a legislature or this or that legislature; it ought to adjourn two days after it meets. My friends, before you reach such conclusions,

before you make that accusation, you ought to take stock among yourselves to ascertain how much you have contributed, how much assistance you have given to that legislative body that your ideas of government may prevail. It is a common practice among business men when election time comes, to say, "I am too busy. I would not be a politician. The politician is a low down creature." If you take that view of it, you have to admit that your government is a low down institution, because your government is, after all, what these men in legislatures make it.

So I wish to impress upon you business men and I have done so many, many times in Wisconsin, that you must perform your full civic duty if you are going to be worthy of the citizenship which the law gives you the right to exercise. You men of business, you men of experience, you men who know what government ought to be, you men who are patriotic, are the ones who should take an active interest in the affairs of the public, and whenever you do not do so you are going to turn this government over to reckless politicians, to men who will drive it into the ground in the end, and men who will destroy you because you must bear in mind, my friends, that after all is said and done, the government is the most important institution for you, for me, and for all of us, and that it is within the power of the government to make us or to break us. A business man has not got to go far now in the examination of a statute, to ascertain the power that the government has lodged in special commissions over business.

The United States government in recent years has given commissions in Washington the power to make or break any business in this country. I am not here to say that that is a good thing or a bad thing. We have had a great deal of discussion in this country about the unfairness of trusts. Some of it was true and some of it was untrue. It is like the unfairness of railroads; some of it was true and some of it was not true. Unfortunately we were not wise enough to separate the truth from the falsehood; it was all thrown together, and public judgment condemned it all. So I say, my friends, when the government lodges that much power in the hands of a commission, as it has lodged in the Commission of Commerce, for instance, you business men who have an interest to preserve, who have your money invested, and the laboring man as well who is interested in keeping the shop door open, it stands you in hand, if this law is to be conservatively administered, that you elect con-

servative men, and put conservative men at the head of each institution. If you do not do so, these commissions will ultimately drift into politics; they will be used for political purposes, and when they are they will be the undoing of this country. Therefore, my friends, when election time comes take an active interest. Don't let George do it. Take an interest, not only in the election itself but take an interest in your neighborhood; make yourselves popular. Do not be afraid to go to the laboring man. I did it. I went to the farmers of Wisconsin. I was one of you. I told my story to them. They believed me. There was no reason why they should not believe me, because I spoke the truth. The farmers of Illinois will believe you. They believe you in business. They trust their business to you; they trust their money to the banker, if you please. Why should they not pay attention to the banker's word or the railroad man's word on matters of public interest?

It is simply this, that you have not cultivated a relation with the public which has prevented the agitator from misrepresenting you to it.

It is time, perhaps, for you gentlemen to return to your work and I do not want to detain you any longer. I want to express my gratitude to you for the kindly reception you have given me, and I want to give you the assurance, gentlemen, that if you come to the State of Wisconsin the authority of the executive will protect you in all your doings that are right.

On behalf of the people of Wisconsin I extend an invitation to you transportation men, to you railroad men, to come to the State of Wisconsin, promote new industries if you will, we need more railroads, we have lots of territory in Wisconsin that could be better served than it is today, and do not be afraid to invest your money in Wisconsin institutions because the people there if they have ever lost their sanity I am sure have returned to it and you will find the State of Wisconsin is today one of the safest states in the Union for any man to invest his money in. The Germans, as well as others, in the State of Wisconsin, believe in paying their debts, and we usually pay them when they are due. So, gentlemen, come and see us, enjoy our beautiful summer resorts, if you please. We have lots of fish that have not been caught. We have many other things that a man can do up there in the summer time; there are some things, of course, that we forbid. However, come. I thank you.

GOVERNMENT OWNERSHIP IN CANADA.*

BY FRANK TRUMBULL.

Chairman of the C. & O. Board.

"May I trespass on your courtesy to call attention to an editorial in *The New York American* of May 26, last, entitled "Shortest Road to Honest Government is by Way of Public Ownership," in the hope of correcting some wrong impressions that might be gathered therefrom?

"From the tenor of this editorial it is impossible not to conclude that government ownership and operation of railroads in Canada is a pronounced success. Since this is not true it seems fitting that the facts about this situation should be stated.

"The Canadian Government has operated the Intercolonial for forty-seven years and the Prince Edward Island Railway for forty-three years. It has built and is now operating the National Trans-continental. The aggregate mileage of these Government roads is 3,800. Not one of these systems earned its operating expenses for the fiscal year ended June 30, 1915. The combined operating deficit of the three was \$350,000.

"For twenty-five years of the forty-seven, afore-mentioned, the expenses of the Intercolonial exceeded its earnings, the aggregate operating deficit being \$11,500,000. For twenty-two years its earnings were greater than its expenses, the gain being \$1,967,000. The net deficit from operation for the whole period of forty-seven years is, therefore, \$9,500,000.

"During every one of the forty-three years of its operation by the Government, the Prince Edward Island's operating expenses exceeded its earnings, resulting in a total operating deficit of \$3,280,000. Together with the net loss on the Intercolonial afore-mentioned, the deficit of the two Government roads is \$12,800,000.

"In 1914 both roads lost \$445,000, the joint difference between operating expenses and earnings; and, as previously stated, these roads showed expenses heavier than earnings for the fiscal year 1915.

*Open letter to the New York press.

"With such losses confronting the taxpayers of Canada, it is pertinent to mention that these Government railroads do not pay any taxes. Last year Canada's privately-owned railroads paid the public in taxes \$3,049,728.

"Apropos of 'honesty' under government railroad ownership and operation, the building of Canada's latest acquisition, the National Transcontinental Railway, has led to a scandal. The cost of this railroad was estimated originally at \$34,083 a mile; it has actually cost \$99,000 a mile!

"In 1914 a Government commission on this operation said that there had been gross mismanagement, extravagance and waste, in connection therewith, running into many millions of dollars; and the Grand Trunk Pacific, because of the enormous expense of this line, declined to lease and operate it at a rental of 3% of its cost.

"Work on the National Transcontinental was directed and supervised by four Government commissioners. The commission subsequently appointed to investigate the whole transaction reported that '\$40,000,000 was needlessly wasted,' and that the cost of the National Transcontinental for principal and interest up to 1921 will amount to \$234,651,251.

"Speaking of the work of the Government's commissioners who directed the road's construction, this investigating commission says:

"Having decided upon a design, the commission proceeded to find a country to fit the design. It may seem incredible, but it is the fact that it was assumed that the road would at once receive the maximum business it was possible to earn with a single track. That there was an entire lack of business along the line does not seem to have occurred to them. . . . and in our opinion the interest payable to the Government and the operating expenses taken together will be about the same as the dividends, interest charges and operating expenses of the competing roads, (privately owned railroads) which are only capitalized at from one-third to one-half as much per mile as is the National Trans-continental.'

"Continuing, the report says that contracts were not let to the lowest bidders; that contractors were overpaid \$3,300,000 on improper classifications; that certain contractors were paid two prices for one handling of material; that the chairman of the commission paid one man \$7,950 on a pretended damage claim, for election activity; that money was spent improperly on unnecessary fences, on unsuitable rails, on the building of unauthorized shops and of double track, in violation of the statute which called for single track.

"The report further condemned the premature construction of the New Brunswick section of the railway, pointing out that if one-third of that cost had been expended on the Intercolonial, all the trunk line facilities necessary for the Province of New Brunswick for many years would have been provided.

"It may interest your readers to know that the Montreal Gazette once commented upon these roads, thus:

"There are not in North America anything like the records the Government made last year in connection with the Intercolonial and Prince Edward Island Railways. These records were made, too, after the properties had been for eight years under control of the present ministers, and after tens of millions had been spent in improving and strengthening the roads for carrying traffic at a loss. It does not seem that incompetence alone, even of the worse kind, can account for such a shameful and threateningly ruinous state of affairs."

"In view of these established and indisputable records, 'the people in their organized capacity, through their Government,' (to quote The American's own words) do not seem to have surpassed, or, indeed, to have equalled, 'the haphazard, disorganized' effort of the individual railroad owner in Canada, whose lines are operated at a profit. Furthermore, these records do not warrant The American's conclusion: 'The shortest road to honest government is by way of public ownership of the public service corporations.'

"A major cause of the poor showing made by the Intercolonial has been the influence of politics. The part which politics formerly played is freely admitted by the officers of the road, although they say that conditions are somewhat different now. 'Almost every abuse known to railroading,' says the Canadian newspaper aforementioned, 'took root and flourished, such as underbilling, that is, permitting a favored shipper to load the cars with a larger quantity of goods than he paid for, while his competitors on the other side of politics were restricted to a standard load and mulcted for any excess; the granting of secret rebates; the maintenance of an excessive number of stations and employees in order to swell the political influence of the road at election times; absurd classifications; unjust tariffs; the acquisition of more or less useless branch lines to serve partisan ends, and so on.'

"Statistics relative to public ownership of railroads in Australia and New Zealand, of which The American made passing mention, prove that the system is similarly unprofitable and unserviceable. And, indeed, this result must ever follow under a system which

capitalizes all its errors and omits the strongest incentive to improvement—the hazard of the private builder, who knows that in error lies loss and probable bankruptcy, and who, accordingly, strives for economy, efficiency and real service.

“‘While private individuals perform a public function they will constantly resist public regulation,’ said *The American*. Surely it could not mean this for the railroads of this country. Regulated by Congress and one Federal commission, and by forty-eight state legislatures and their respective state railroad commissions, our carriers today are over-regulated, if not strangled, by an uncoordinated, conflicting, illogical and unbusinesslike system of supervision. It is not regulation, but forty-nine masters, that are proving too much for the railroads, whose strength, after all, is limited.

“Far from resisting regulation, all the railroads of the country are in favor of regulation; but they ask that regulation be sane and consistent. The inquiry proposed by the Newlands resolution, now before Congress, would give every citizen an opportunity to be heard on this vital question and, perhaps, lead to a sensible, consistent policy of railroad supervision.”

RAILWAY MAIL PAY*

BY ALAN V. ARRAGON.

When Representative John A. Moon of Tennessee attempted to secure the passage through Congress in the last hours of its session on March 3 and 4, 1915, of the final form of his Railway Mail Pay bill he was maintaining a proposition that could meet the tests of neither justice nor good public policy.

The Moon bill, when analyzed, resolves itself into an attempt to establish a plan of mail pay founded on the theory that the government, when it seeks to extend the functions of any of its enterprises, may use, without adequate compensation, the property of any person or corporation with which the governmental enterprise comes into competition and thus advance its own interests at the expense of the owner.

The enactment of the proposed measure into law would amount to the arbitrary exercise of the sovereign power to compel the railroads to grant a discriminatory rate on mail matter and parcel freight. This is in direct contradiction to the principle of "no unfair discrimination" insisted upon by the government in its fight against the iniquitous rebating system. The American people may thus see their government, when its own business aspirations are at stake, violate the rules which, for the sake of maintaining free and fair competition, it has required the great corporations of the country to follow.

In the effort to make the Moon bill a law, recourse was had to the indefensible parliamentary expedient of fastening the railway mail pay clauses as a "rider" upon an important appropriation bill. The attempt failed. Both the "rider" and the postal appropriation bill were lost. But the circumstances surrounding the last hours of the Moon bill were such as to arouse prejudice against it in the minds of disinterested observers.

It is to be remembered, however, that the postoffice officials in backing the measure acted under the strong compulsion that is laid on them to make the department self-supporting and to avoid the recurrence of the traditional annual deficits. No exception is to be

*Article appearing in *"The Traffic World,"* July 17, 1915.

taken to the purpose of the officials in attempting to meet the demands of the public in this respect. It shows a praiseworthy appreciation of the necessity of putting the department upon a business-like basis. But exception is to be taken to the means that they are endeavoring to employ in order to gain this end.

On the surface the chief feature of Representative Moon's measure is to change the basis of railway mail pay from "weight" to "space." The Postoffice Department describes the change as constituting a long-needed reform of an antiquated system of pay, but a closer study of the provisions of the bill and the conditions under which the railroads carry the government mails, leads to the conclusion that the main design of the bill is to provide a basis for a more successful entrance of the Postoffice Department into the parcel freight business and to secure a general reduction of the transportation charges of all classes of mail matter. The postmaster-general has declared that it is his purpose to press the passage of the Moon bill at the opening of the next session of Congress. This announcement makes the bill the chief factor at present in the railway mail pay controversy, and makes it essential that the elements of danger in it should be carefully examined and clearly stated.

GOVERNMENT AS A COMPETITOR OF RAILWAYS AND EXPRESS COMPANIES.

Under the present plan, the Postoffice Department pays the railroads for carrying mail on the basis of weight, as determined by weighings conducted on each mail route for a period of 105 days, once every four years. The department is now, therefore, paying for service. Under the proposed plan it would rent such an amount of space as the postmaster-general might choose to authorize the railroads to provide. The department would then be paying for facilities, not service.

On the face of it this proposition seems fair enough, but the fact is that the department is now filling its cars with certainly no more than one-half loads. It proposes, under the Moon bill, to have the privilege of loading those cars as heavily as it chooses at about the same rates per car as are now intended to compensate the railroads for hauling the light loads at present carried. The net result of this proposal is that the department, without making any greater

payment to the railroads, will be able to have carried at least twice as much mail matter and parcel freight as is now carried. In other words, the railroads will be compelled to give double the service without receiving a dollar additional pay.

It has already been indicated by the postoffice officials that it is their intention to increase the weight limit of parcels sent under parcel post to one hundred pounds. The postal authorities would then be enabled, under the Moon bill, to carry parcels ranging from one pound to one hundred pounds at rates which would make the department a strong competitor of the express companies and even of the railroad companies in their freight business. It is an extraordinary situation that would force the railroads to be parties to serious competition with their own freight service.

Such competition has, in fact, already begun. The report of the joint congressional committee on the parcel post of which Senator Bristow was chairman, publishes numerous communications from local postmasters throughout the country which indicate the entrance of parcel post into the express and freight business. Hardware, iron and steel castings of all kinds, such as plowshares, cog-wheels, etc., butter, eggs, coal, wheat, hides—these are some of the things which are already, under present rates, being shipped by mail on the fastest passenger trains and in the heaviest and most expensive cars.

It is held by some that it is the main purpose of the parcel post service to provide just such competition with the express companies, so as to reduce the cost to the public of the transportation of that class of freight. The postmaster-general believes that there is an economic saving to be made here and that he is called upon to make it.

But is it a paying proposition from the standpoint of the general welfare to have a large volume of freight traffic shifted from freight trains, where it belongs, to passenger trains, where it does not belong? By permitting the Postoffice Department to conduct an extensive freight business on passenger trains the high standards of efficiency and service now maintained in the passenger and mail branches of the transportation business would be seriously impaired. The complete separation of the freight and passenger traffic is one of the first essentials in keeping up the standard of service in both.

In regard to the argument that the government will be able to haul parcel freight for the public at cheaper rates than the express companies offer, it seems necessary to point out that we have already a well-trained and impartial administrative body whose duty it is to see that the charges of the express and railroad companies are not excessive. No one questions the faithfulness with which the Interstate Commerce Commission is carrying out its duty to the public in this respect. So that, if the Postoffice Department is able to offer lower rates on parcels than the express companies, it cannot be because the express charges are unreasonably high.

There remain only two possible reasons: First, that the Postoffice Department, by some superiority in its organization over the organization of the express companies, is able to conduct the parcel business at less expense than the express companies, or, second, that the Postoffice Department is not, and, under the proposed rates, would not be, paying the railroad companies a sufficient amount for the hauling of the parcel freight matter.

As to the first: No one who is familiar with postal finances would believe that the department could possibly show any saving over the well-organized and highly systematized operations of the express companies, if all expenses properly chargeable against the postal revenues were so charged.

As to the second possible reason: If the Postoffice Department claims to be able to save a large part of its transportation cost, it must be a bona fide saving. To make an apparent saving at the expense of the railroads is not real economy. It is merely shifting the burden from those who ought properly to bear it to those who properly ought not to bear it. Furthermore, under such an arrangement, certain lines of business, favored by low parcel rates—chief among them the great mail-order concerns—are provided with a large subsidy. To promote the growth of one industry at the expense of another is directly opposed to the dictates of good public policy.

AUTOCRATIC POWER GIVEN THE POSTMASTER-GENERAL.

Detailed examination of the Moon bill shows the extent to which the postmaster-general would be empowered to go in order to build up a freight business for his department on the most favored terms.

Under the provisions of the bill the postmaster-general would be authorized to make the car-mile rates for mail cars at "not exceeding" those named in the bill. He could, therefore, reduce them as much as he might think best and if the railroads should refuse to carry the mails at the rates he set they could be fined \$5,000 for each offense. It is true that the "not exceeding" clause is also in the bill under which the mail rates are at present governed. This important distinction, however, is to be made, that the present law merely authorizes the postmaster-general to enter into voluntary contracts with the railroads at rates not exceeding those named by Congress, while the proposed plan would compel the railroads, under penalty of \$5,000 fine, to accept the demands of the postmaster-general.

Another provision of the Moon bill is that mail storage cars which can be loaded with 20 tons of parcel freight are to be rented by the Postoffice Department at little more than 20 cents a mile, thereby giving a rate of 1 cent per ton-mile for parcel freight. The average ton-mile rate for all freight, including such heavy and cheap commodities as sand, coal, lumber, stone, ore, bricks, etc., which are carried in much less expensive cars, at slow speed and with inferior service, is, for the whole country, $\frac{3}{4}$ cent (7.44 mills). For the western railroads it is, for all classes of freight, 9-10 cent (9.21 mills) per ton-mile.

That the postal authorities, who are the real constructors of the Moon bill, plan to load the storage cars to capacity, so as to secure the extraordinary low rate of 1 cent per ton-mile for parcel freight, is apparent from the clause in the bill which reads:

The Postmaster General may, in his discretion, distinguish between the several classes of mail matter and provide for less frequent dispatch of mail matter of the third and fourth classes and periodicals when lower rates for transportation or other economies may be secured thereby without material detriment to the service.

It is already a practice of the department in handling its parcel business to concentrate large quantities of such matter at terminal points so as to avoid distribution en route, thereby permitting heavier loading. This fact, coupled with the quoted clause, would indicate that it is more than probable that the department would concentrate its freight matter and ship it in the heaviest loads that can be carried by storage cars.

The effect such competition would have on the railroad's freight business will be understood if we take the ton-mile rate on parcel

freight under such a system of heavy storage-car loading and compare it with the ton-mile rate paid by private shippers for first class and sixth class freight.

Take, for example, the haul of ninety miles between New York and Philadelphia: The present first class freight rate is \$4.40 per ton and the present sixth class rate is \$1.90 per ton, but under the proposed mail rate the department could move its parcel freight between those points at \$1.10 per ton, including both terminal and line charges, and this notwithstanding the fact that the department's parcel freight would be hauled on fast passenger trains or special fast mail trains, while freight moves on slow trains, in inexpensive cars, and is dispatched at the convenience of the railroad company.

It is preposterous to believe that Congress would contemplate such confiscation of railroad property and legitimate railroad business if it was advised of the facts in the case. Should the government really desire to take over the freight traffic between New York and Philadelphia, let it do so openly and frankly, saying to the railroads plainly: "We desire to appropriate your New York-Philadelphia freight business to assist in covering our postal deficit." Examples could be multiplied the country over showing the serious competition that the railroads will have to meet in their short-haul traffic if the Moon bill is passed in the next session of Congress.

One peculiarity of the Moon bill is that it presupposes the postmaster-general, by virtue of his office, to be possessed of superhuman powers of judgment, self-restraint and personal disinterestedness. He is specifically given authority to reduce the car-mile rates named in the bill to correspond with differences in the cost of construction and maintenance of mail cars, as his discretion may dictate. Thus the postmaster-general could demand that mail cars should be of the latest, most improved type and could fine the railroads for not discarding hundreds of good, serviceable cars, no longer acceptable merely because they were built before the introduction of the most recent improvements.

FAULTY COMPARISONS OF MAIL AND EXPRESS.

Another method by which the Moon bill would make possible a further reduction of the compensation of the railroads for the transportation of mail is by the clause which authorizes the post-

master-general to compel the railroads to carry mail matter, other than first class, at rates not exceeding the railroads' share of express charges, wherever he may find the express rates lower than the mail rates. But there is no corresponding requirement that mail rates shall be raised to the level of express rates where the express rates are the higher.

Just what use the department would probably make of this clause is evident from the officially published comparison of express rates and mail rates drawn up by the second assistant postmaster-general, Mr. Joseph Stewart. General Stewart states, on the strength of his table of comparisons, that the railroads receive for carrying mail matter about twice as much as they receive for carrying express matter of the same class. At first glance, his table looks not unreasonable, but a more careful analysis reveals that it has been constructed on very erroneous principles.

In the first place, the average length of the haul between the points chosen by him for comparison is 1,587 miles, whereas, under the test taken by the Interstate Commerce Commission, the average haul of express matter has been shown to be certainly not much greater than 200 miles. Express rates per pound per mile decrease rapidly as the length of the haul increases, but mail rates do not vary at all with distance. The result is that by uniformly taking long hauls, most of them transcontinental or semi-transcontinental, General Stewart has compared the mail rates with the lowest express rates. If short hauls had been taken, the direct opposite would have been shown. By the application of this comparison the postmaster-general, under the proposed plan, could reduce the long-haul mail rates without raising the short-haul mail rates.

Second, General Stewart has chosen as the basis of his comparison the rates on a one-hundred-pound parcel. Given a particular mail route, the mail rate per pound is no less on a one-hundred-pound parcel than it is on a one-pound parcel, while in the case of express the rate for a one-hundred-pound shipment is the very lowest pound rate that can be secured. The comparison, therefore, while apparently showing that the rates on mail transportation are excessive, seem to do so only because abnormally low express charges are selected. A fair comparison would choose a parcel of such weight as would bear the average express rate for the particular haul in question.

Furthermore, General Stewart has selected New York as the initial point for more than 90% of the examples given. This again reduces the railroads' share of the express rates below normal without affecting the mail rates; for express rates are very much lower in the East than they are in the West, as shown by the following figures, giving the line charge for the railroads' part of the express service:

Zone 1, northeastern section, 15c per 100 pounds for the first 50 miles.

Zone 2, southeastern section, 18c per 100 pounds for the first 50 miles.

Zone 3, trans-Mississippi section, 24c per 100 pounds for the first 50 miles.

Zone 4, intermountain section, 28c per 100 pounds for the first 50 miles.

Zone 5, Pacific Coast section, 24c per 100 pounds for the first 50 miles.

Finally, the table takes no note of the very important differences in the services rendered by the railroad companies to the Postoffice Department as compared with the services rendered to the express companies. The railroad companies must load and unload the mails, must carry them between stations and nearby postoffices, must provide distribution space in the postal cars, which results in the light loading of the cars, must place cars in terminal stations in advance of the time of train departure, and must render numerous other services which are not required of them in the case of express.

It is by a method of comparison containing errors of so striking a nature that General Stewart incorrectly shows mail rates to be higher than the railroads' share of express rates. That the comparison between mail rates and express rates should be used as a final basis for determining mail rates is an untenable proposition, owing to the differences in the services just referred to, but if it is to be used even in part, let it be used fairly. Let a comparison be made as between the mail rates on a route which bears an average mail rate per pound per mile, and then let that rate be applied to the express parcel which bears an average express rate. Let it be further stipulated that the route shall approximate the average length haul for express matter. The results of such a comparison

may be of value, provided the differences in the two services, in the loading of the two kinds of cars and in the dead weight of the cars themselves, are taken into consideration.

PARCEL POST PAYS RAILROADS HALF AS MUCH AS EXPRESS.

The postmaster-general, however, believes that the department is doing an enormous parcel business "in the face of unequal conditions" resulting from "inordinately heavy transportation costs amounting to about double the transportation costs borne by the express companies." This statement is, of course, based on the erroneous comparison made by General Stewart, but can be further tested from the postmaster-general's own figures. In a recent article he stated that the total increased pay to the railroads on account of parcel post will amount to \$4,322,554 for the fiscal year ending June 30, 1915. He has also estimated that the parcel business now amounts to over eight hundred million packages a year. Under the assumption that the average parcel weighs not over one pound, this would amount to pay to the railroads of about one-half cent per pound. The average amount received by all railroads for carrying express matter of the first class under 100 pounds, with which alone mail and postal parcels can be compared, is about one cent per pound.

Thus the statement of the postmaster-general that his department pays to the railroads for the carriage of parcel freight twice as much as the express companies pay is the reverse of the fact. Instead of bearing a transportation cost double that borne by the express companies, the Postoffice Department, on its own figures, is really paying only one-half as much.

POLITICS AND THE DEPARTMENT.

The department is facing for the fiscal year just past a deficit variously estimated up to \$20,000,000, and until the year 1913 a deficit ranging from \$3,000,000 to \$17,000,000 was the rule. Under the growing feeling that the distribution of mail matter and parcels is a strictly commercial service and should, therefore, be entirely self-supporting, the department has been forced to consider ways and means of keeping its expenditures within the bounds of its revenues.

Four ways are open to it as a business organization, but they are all more or less effectively closed by political considerations. They are:

- (1) To reduce the expenses of the rural free delivery;
- (2) To raise the nominal rates on magazines and other second class matter;
- (3) To revoke the franking privilege; and
- (4) To make parcel post maintain itself.

It is important to appreciate something of the saving that could be made by the application of good business principles to these features of the postal service.

On the department's own figures, the annual loss to the government in the transportation of newspapers, magazines and all other second class matter amounts to some \$50,000,000. The franking privilege and the shipment of free departmental matter costs the postoffice another \$15,000,000.

The expense of the rural free delivery service, as estimated by the postmaster-general himself, could probably be reduced by about \$20,000,000 through a systematized extension of the "star route" service. The loss on the parcel post is too much a subject of controversy to permit the hazard of a guess, but the total of the other three items gives an unnecessary annual loss in the postal finances of about \$85,000,000.

Of this amount it should be possible to save more than enough to cover the impending deficits were it not for the interference of politics. Political considerations are so strong that the postal authorities and Congress are anxious to find a popular way of reducing the department's expenses. Hence the program of shifting to the railroads the burden of the inefficient postal financing.

FAILURE OF SPECIAL COMMISSIONS

The mistake has frequently been made of considering the Post-office Department as including among its functions more governmental and judicial powers than it logically should include. The postoffice officials have quite a large enough task before them of keeping up both the efficiency and the economy of the mail service without assuming or having thrust upon them wide discretionary powers relating either to questions of railroading or of government.

This view is set forth here under the earnest conviction that the Postoffice Department is doing a purely commercial and not in any sense a governmental service, so that if it desires to make use of the transportation agencies of the country it should be subject to the same conditions as any other shipper.

The ordinary shipper deals with the railroads only in a business way. He has himself no governmental control over the carrier to insure regularity and security of service and the charging of reasonable rates. For such regulation he must look to the Interstate Commerce Commission. The postoffice alone of all organizations performing commercial services exercises governmental authority over the carrier with which as a shipper it has contractual relations.

The Interstate Commerce Commission is the trusted agent of the interests of the people, so far as all other transportation matters are concerned. Why should it not be intrusted also with the control of the transportation of the mails?

Yet, for some reason, Congress has always deemed it necessary to retain more immediate power in the settlement of questions relating to the Postoffice Department than in the case of general railroad problems. Being itself unable to straighten out the intricacies of the mail pay problem, it has followed the policy of appointing special congressional or departmental commissions.

There have been four of these commissions appointed since the passage of the basic law by which mail pay is at present governed, but no legislation has been enacted in conformity with the recommendations of any one of the four special commissions. The Wolcott-Loud commission of 1900 reported that the mail pay to the railroads was not then excessive; yet Congress has since authorized a reduction of pay on the weight basis of from five to ten per cent for the heavier routes and of pay for the postoffice car facilities of from eight to twenty per cent, varying with the size of the car. Furthermore, the postmaster-general, by a departmental order, unauthorized by Congress, has reduced the pay by approximately an additional 15 per cent.

A new joint congressional committee, commonly known as the Bourne Commission, was appointed in 1912. It reported, Aug. 31, 1914, that the railroads are underpaid by certainly not less than \$3,000,000 a year. Yet, without so much as waiting for the final report of its own committee, the House passed, and subsequently,

notwithstanding the report, repassed, a bill whose chief merit was openly stated to be that it would further reduce the railroad mail pay by from \$8,000,000 to \$10,000,000 annually.

Clearly, there can be no further use in appointing special commissions to investigate the problem so long as Congress and the department believe that the transportation of mail is in some way radically different from the transportation of all other commodities and that, while the control of rates which produce revenue amounting to many hundred million dollars annually can be intrusted to the Interstate Commerce Commission, the questions involved in the mail pay problem are of an importance too great to be left to the judgment of those specially trained commissioners.

LEAVE IT TO THE COMMISSION.

A thorough examination of the whole problem would seem to lead inevitably to the conclusion that a controversy which has come to be carried on with considerable bitterness of feeling and some incrimination, should as soon as possible be referred for settlement to an impartial and neutral tribunal. Such a tribunal is to be found in the Interstate Commerce Commission. Neither the postmaster-general, nor his assistants, nor Congress, nor committees of Congress have the special training in railway matters which the right solution of this question requires.

By intrusting to the Commission the determination of what constitutes a just rate of pay for the transportation of the mails, there will be secured impartial and specially trained judges, a well-organized body of accountants and statisticians and a flexibility of rate readjustment sufficient to meet all changing conditions. The decision of the Interstate Commerce Commission will command the respect, as being fair and reasonable, of the Postoffice Department, the members of Congress, the railroads and the public at large.

RAISES SIZE OF PACKAGES.

News item, July 17, 1915:

"Postmaster-General Burleson has ordered that the size limit of packages for parcel post shipment be increased to a combined length and girth of 84 inches, which will permit the mailing of standard sized fruit and berry crates. The old limit was 72 inches length and girth.

"The postmaster-general also authorized the establishment of a receipt system for parcel post packages similar to that employed by express companies.

"The new regulation,' says a department statement, 'provides that on payment of 1 cent the postmaster at the mailing office may give the sender of an ordinary parcel of fourth class mail a receipt therefor. A postage stamp to cover the charge of the receipt will be affixed to the parcel and the name and address of the addressee shall be written in the receipt by the sender.'"

SHALL UNCLE SAM OWN THE RAILROADS?

ADDRESSED ESPECIALLY TO RAILROAD EMPLOYEES.

BY RICHARD HOADLEY TINGLEY.

From The Railroad Herald.

Did you ever go into any of the big departments in Washington—the Bureau of Printing and Engraving, the Pension Office, Land Office or Postoffice Department? Did you ever walk into any state or municipal office where a large number of clerks are employed, as the office of recorder of deeds, the highway department or water department? If you never have, try it some day; you who are familiar with the sight of railroad men at work. You will see men who know that there is not the slightest chance of ever getting up to the head of the department in which they happen to be, because such places are all filled by politicians; by men with political pull; by men that can control votes. As you watch these men you will wonder, from your railroad point of view, how they keep their jobs. If you are a good office man yourself you will see, if you stop a little and use your eyes, that it is taking somewhere between two and three men to do one real man's work. In other words, you will see inefficiency where you are accustomed to see efficiency. Do you want to put yourself on Uncle Sam's payroll and become a drone? You know very well that in no field of activity is there better opportunity for advancement than in railroading. It's up to you. If you make good, no matter how humble your start, you can get to the top or very near it. You all know of plenty of instances where it has been done. So, do you want to be transferred from the payroll of the railroad to the payroll of Uncle Sam? Do you want to put yourself on a par with the letter carrier? What chance has he for promotion? Do you want to put yourself on a par with the railway mail clerk? You know him perfectly well. You see him every day. He is your friend. What chance has he to become anything but a railway mail clerk? Contrast the condition of the average trainman with his railway mail clerk brother who travels and works on the same train. His pay is less than yours. He is often required to work long hours after for which he receives no "overtime." His hours are often twice those of the average train man.

He is under civil service regulations and is required to take frequent re-examinations. For these he must prepare himself and take them, on his own time. Failure in one of these means dismissal from the service. The limit of his achievement is to become a mail clerk foreman, and here he is also subject to civil service regulations. Beyond this he can not go without political pull. Contrast this with the condition under which the average trainman works. His hours are shorter, his pay better and he is a free agent; free to get to the top if he has the ability. Was ever a postmaster-general, or any one high in the mail service, recruited from the ranks?

In all branches of service it is notorious that governments are ungrateful to servants in civil branches. Opportunity for advancement in rank, and in remuneration, are far greater in private than public service. We think we have some rather able men at the head of our big railroads now—and we have. They are well paid and they earn their money. Our biggest system is of itself but a toy, a model, a miniature when compared with the vast railway mileage of the United States that the advocates of nationalization want the government to take over and operate as one system. Have we any man or set of men capable of assuming the management of 250,000 miles of line? Because men exist who are capable of successfully handling 12,000 or 15,000 miles, does it follow that men capable of operating a property twenty times this size could be had for any money? This would certainly be an untried experiment.

If the man were found or could be educated to this enormous undertaking, he would have to be a colossus; a genius. Would this colossal genius, if indeed he could be produced, submit to the "red tape," the politics and the petty annoyances that always hamper government civil employees? Would this colossus consent to work for the small pay that Uncle Sam seems to think is a fair remuneration for the services of his servants? Recall the case of the early work on the Panama Canal. At different times two railroad men, both with established records for the highest ability and efficiency were placed in charge of this undertaking. Both of these men were failures on the canal. Because they were too strong, too independent, too capable to bring themselves to adopt the "red tape" methods that were necessary under Uncle Sam's management. These men were too broad, too big, too able to play politics. They could not stand bureaucracy.

Under government control there would be but two classes of men from which to recruit the railroad heads. There would be but two motives to attract men to shoulder the responsibilities of the high managerial offices that would have to be filled. In the first class would come what might be called patriots; strong, capable men, willing to serve their government on a scale of remuneration much below what they might otherwise command for patriotic reasons only. In the other class would be found men without expert knowledge or experience; men willing to take on any responsibility and run the chances; offices seekers.

Other nations have tried government ownership. Germany is the only nation in the world where the financial balance as the result of government ownership is on the right side. The reason is that Germany is a military nation, and the railroads are run on military lines.

In all cases of attempted railway nationalization, the trouble has been politics. It has been found impossible to keep politics out of railroad affairs under government operation in other nations, and it will be so in this country; we can not escape the issue. It would be exaggerated in the proportion as our mileage is greater than that of the nations that have tried the experiment; many to their sorrow. This is the principal reason why the people of the United States should avoid trying out an idea that has proved to be a practical failure in so many instances.

The government allows no pensions to its civil industrial employees. Contrast this with the attitude of the railroad managers toward its disabled and superannuated men. Millions have been spent by them in pensions to faithful employees.

Under the Constitution of the United States, the nation can not be sued. If you have a grievance against your employer, and your employer is Uncle Sam, you are debarred from presenting your case, nor can you sue for damages. Your hands will be tied. You will have to accept the situation and make the best of it.

The government ownership idea is a product of the times. There is a craze on in Washington for investigation. Everything big is being investigated and the railroads, being the biggest thing in big business, are getting their full share. The era of reform is on, and Washington is trying to reform everything big.

Now, investigation and reform are both all right. If investigation is intelligently carried on, guided by experts with experience in

the matters under investigation, good may be expected to come from it. If investigation is guided by the kind of men who boldly assert, without a scrap of evidence, that the railroads can save a million dollars a day if they will practice a little economy, by men who claim that \$464,000,000 may be annually saved in interest alone, if Uncle Sam buys the railroads; then but little good may be expected to result.

Reform is all right, too; reasonable reform. Reform that does not try to remedy all the evils of the universe at once. Any one knows the railroads need reforming; that abuses have grown up under the system or systems of regulation now in force. But is this entirely the fault of the railroads? You must remember that we have 47 different and separate regulating bodies to which the railroads must look for orders; a regulator in each state and one in Washington, besides. Surely reform is needed somewhere. But let us go slowly with reforms. Let us be sure who it is that needs reforming.

CONFLICT BETWEEN STATE AND FEDERAL REGULATION*

BY WALKER D. HINES,

New York City.

The Interstate Commerce Act declares (section 3) that it shall be unlawful for any common carrier engaged in interstate commerce to make or give any undue or unreasonable preference or advantage to any particular person, locality or description of traffic in any respect whatsoever, or to subject any particular person, locality or description of traffic to any undue or unreasonable prejudice or disadvantage in any respect whatsoever.

If a common carrier on its own initiative should establish an intrastate rate which would work an unreasonable preference or prejudice to any shipping interest concerned with an interstate rate of the common carrier, such action would be a violation of this provision. For example, if a common carrier should establish an intrastate rate between St. Louis and Kansas City so low in comparison with the interstate rates established by it between Chicago and Kansas City as to subject those interested in traffic between Chicago and Kansas City to an undue prejudice or disadvantage, such action of the common carrier would be a violation of the Interstate Commerce Act.

If the intrastate rate which works the undue prejudice to the interest concerned in the interstate rate is established by state statute or by order of a state commission, such statute or order necessarily becomes void when such prejudicial effect is ascertained in the manner prescribed by the Interstate Commerce Act. To follow the illustration just used, if the legislature of Missouri should pass a statute or the commission of Missouri should make an order prescribing a rate between St. Louis and Kansas City which would work an undue prejudice to those interested in traffic between Chicago and Kansas City, such statute or order would be void when the fact of the undue prejudice had been duly established in a proceeding before the Interstate Commerce Commission.

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the invalidity of the state statute or order under the circumstances supposed is the natural result of our form of government. Commerce among the states is committed to the care of Congress under the federal constitution. Direct burdens cannot be imposed upon interstate commerce by state legislation or under state authority. It would be difficult to conceive a more direct burden upon commerce among the states than an intrastate rate adjustment which works a prejudice to those concerned in interstate commerce so unreasonable that it would be in violation of an act of Congress if done by the common carrier on its own initiative. The federal constitution wisely provides that the laws of the United States made in pursuance thereof shall be the supreme law of the land "anything in the constitution or laws of any state to the contrary notwithstanding." The necessity for such a paramount national authority in matters of national concern is self-evident. This necessity is particularly striking with reference to the interstate rates of common carriers. It would be unthinkable under our scheme of government that the state of Missouri should decide the commercial fate of the city of Chicago even with reference to traffic from or to Kansas City. There is only one power which has a horizon broad enough to decide what ought to be done and only one power extensive enough to reach all the parties concerned and that power is the government of the United States.

Even if the Interstate Commerce Act applied only to specific interstate shipments, the act would control an interstate rate adjustment which unreasonably prejudiced such specific interstate shipments. But the act is not drawn to apply merely to interstate shipments. It is drawn to apply to common carriers which are engaged in interstate commerce and it applies to the entire business of those common carriers, excluding only the business which is expressly excepted. The only exception is business which is "wholly within one state." When a state rate adjustment affects business in addition to business that is wholly within one state, then the exception ceases to apply.

These results inevitably follow from an economic fact which no legislation can abolish and that fact is that the influence and effect of a rate of a railroad company extend beyond the specific traffic to which the particular rate primarily relates. If we could not only make but could put into effect the almost unthinkable supposition that every railroad rate could be regarded as a thing

entirely to itself and concerning no one but the shipper and the consignee of the specific article carried on that rate, then the public would have no reason for making any effort to secure a reasonable relative adjustment of rates so as to prevent one rate from being injurious to others who use other rates, and intrastate rates could stand without regard to their relationship to interstate rates. But if we abandon such a strenuous exercise of the imagination and face the facts, we know that there is an inter-relation of rates which is inherent in the nature of the business conducted by the railroads (and it is this inter-relation which is the basis of the whole scheme of public regulation of rates) and that no legislation can change this condition. It is equally a fact, which no legislation can change, that this inter-relation is not affected in the slightest degree by the imaginary line which separates one state from another. Hence a rate primarily dealing with an intrastate transaction may have a substantial practical effect upon some phase of interstate commerce; and the very arising of this condition inevitably brings the matter within the power of Congress.

This matter is settled by the decision of the Supreme Court of the United States on June 8, 1914, in the case of *Houston & Texas Railway Co. v. United States*, 234 U. S. 342. In that case the Interstate Commerce Commission prescribed maximum rates from Shreveport, Louisiana, to points in Texas intermediate between Shreveport and Dallas. The Commission also found that the carriers maintained higher rates from Shreveport to such Texas points than those prescribed by the Texas Commission from Dallas to such points under substantially similar conditions and that thereby an undue preference was given to Dallas. The Commission accordingly ordered the carrier to desist from charging higher rates from Shreveport to such intermediate points than were contemporaneously charged from Dallas toward Shreveport for equal distances. The order contained similar provisions concerning the rates from Shreveport and Houston to points intermediate between those two cities. Under this order the carriers had the right to correct the undue preference by increasing their intrastate rates from Dallas and Houston to the designated points in Texas up to the maximum rates which the Commission had prescribed from Shreveport for equal distances toward Dallas and Houston respectively.

The Supreme Court, in an opinion by Mr. Justice Hughes, upheld this order. The court held that Congress had the power to control

the intrastate charges of an interstate carrier to the extent necessary to prevent injurious discrimination against interstate traffic, and that Congress had exercised this power. The court pointed out that the provisions of Section 3 of the Interstate Commerce Act against undue preference and undue prejudice were sweeping and that there was no exception with respect to an unreasonable discrimination against interstate traffic produced by the relation of intrastate rates. The following quotation is from the court's concluding remarks:

We are not unmindful of the gravity of the question that is presented when state and federal views conflict. But it was recognized at the beginning that the nation could not prosper if interstate and foreign trade were governed by many masters, and, where the interests of the freedom of interstate commerce are involved, the judgment of Congress and of the agencies it lawfully establishes must control.

Manifestly the Interstate Commerce Commission's duty to protect interstate commerce from unreasonably prejudicial intrastate rates and practices is precisely the same whether those injurious rates and practices are initiated by the carrier or by officers of the state.

The doctrine of the Shreveport case applies, of course, not only to unlawful discriminations in rates but to all acts of prejudicial conduct required under state authority which would be unlawful under the Interstate Commerce Act if committed by carriers on their own initiative. For example, this statement includes prejudicial discriminations or burdens as to practices such as the unequal distribution of cars and the preferential movement of trains or of particular sorts of traffic.

So far the writer has dealt with this matter from the standpoint merely of the prejudice to specific interstate traffic conducted in competition with the intrastate traffic which enjoys the preference. But the paramount national control of interstate railroads rests upon an even broader and deeper foundation than the relative adjustment of rates of competing shippers. Interstate shippers and passengers have the right to fair treatment in the rates for transportation upon railroads, and they also have the even more important right to have railroads upon which an efficient transportation service can take place.

It is probably fair to say that on an average at least three-fourths of the railroad business handled by railroad companies in the

United States is interstate and foreign business and not more than one-fourth is intrastate business. As to any one railroad, this one-fourth intrastate business is split up among all the states through which that railroad runs. Consequently the interest of any one state (when tested by its intrastate business alone), in a given railroad is ordinarily a very small fraction of the total interest of the general public in the business of that railroad.

In view of the great predominance of interstate and foreign traffic, the successful operation of the railroads is a matter of concern far more to the nation than to the intrastate business of any individual state or of all the individual states put together.

It is indispensable to the successful conduct of railroads under private ownership that they shall enjoy a net income sufficient to enable them to attract the additional capital which they need in order to keep their public service abreast of the growth of business and of the increasing public demand for improved and safer service. If this condition fails the breakdown of railroad credit will result and national ownership or national guaranty of railroad securities must follow. Therefore, until the nation elects to change the present policy of private ownership, it is a matter of paramount interest to the nation that the railroads necessary to carry the interstate and foreign traffic in which the nation is interested shall enjoy a sufficient net income to continue the proper development of their service.

An impairment of the net income of a railroad company through the action of a single state is necessarily an impairment of the company's general resources and credit and the injurious consequences cannot be segregated and confined to the company's intrastate business in that state. Railroad operations for interstate purposes and for intrastate purposes are inseparably intermingled and money invested in railroad improvements is devoted indiscriminately to intrastate service and to interstate service. Investors in determining whether to invest in the securities of a railroad company look at its returns as a whole. If they are confronted with the probability that the railroad company's net income is going to be cut to the extent of \$1,000,000 per year, that cut is the ultimate fact which arrests the investor. It makes no difference to him whether the cut comes from state action or federal action. The result in all cases of substantial impairment of net income is

the same, regardless of the source of the reduction, that the raising of money for railroad improvement is rendered more difficult and costly if not temporarily impracticable.

The impairment of railroad credit by state action may come from increases in operating expenses and taxes or from reductions in revenues or from requirements of additional capital expenditures. The extent of the burdens resulting from state action on these matters is not generally understood, has never been adequately catalogued and presented, and is only imperfectly appreciated by the railroad managers themselves.

It is probably true that the greatest impairment comes through increases in operating expenses and taxes, although reductions in rates are perhaps more obvious. The state laws relative to full crews, length of trains, hours of service, and all the countless details of operation impose in the aggregate enormous burdens upon railroad companies, seriously diminish their net income and impair their credit to the prejudice of the interests of the nation.

In the matter of rates there is a serious direct impairment of general railroad credit due to the loss of revenue resulting from unduly low rates as applied to intrastate business in a particular state. But state action has a still further important bearing upon railroad results because in many matters the state rates have a controlling effect upon rates beyond the borders of the states. Rates fixed by the state of Missouri between St. Louis and Kansas City control the rates between points in Illinois and Indiana and points in Kansas and Colorado. Rates prescribed by the state of Ohio have a controlling influence upon rates between Ohio and Indiana and Illinois points and even upon rates wholly within the states of Indiana and Illinois. Rates fixed by the state of Georgia, coupled with ocean rates to Georgia ports, control the rates from New York and Philadelphia to Georgia points and other points in the Southeast, and this in turn controls the rates from Louisville and Cincinnati, St. Louis and Chicago to the same points in the Southeast. Rates fixed by the state of Texas from Galveston to Texas points, coupled with ocean rates to Galveston, control to a large extent the interstate rate structure from New York and many other cities to Texas points.

In these ways it is always possible, and it frequently happens, that the action of a single state taken by legislators or commissioners

who, of course, are charged with no responsibility as to national affairs and have no adequate opportunity or encouragement to take a national survey of the situation, operates directly to increase expenses or cut down revenues and thereby to impair the net income and consequently the credit of a railroad company when perhaps more than ninety per cent of the business of the company is, in a constitutional sense, entirely beyond the jurisdiction of that state and when the welfare and credit of the company is primarily a matter of national concern.

But the difficulties go beyond matters which relate to the net income from railroad operations. The issue of railroad securities is largely dependent upon state action, although those securities are issued primarily to raise money for railroad development which is primarily and principally for national as distinguished from state use. A state may withhold or delay action upon the issue of securities to the serious prejudice of the interest of other states and of the nation.

Again, the ability of a railroad company to carry on business to the advantage of the country generally may be dependent on its getting a charter or a license from a particular state although not five per cent of the company's business may be intrastate traffic in that state.

As was said by the Supreme Court in the Shreveport case above referred to, "It was recognized at the beginning that the nation could not prosper if interstate and foreign trade were governed by many masters." It is becoming increasingly manifest that the railroad credit which is indispensable to provide under private ownership the channels for interstate and foreign trade cannot be permanently secured if the factors which must underlie that credit are governed by "many masters," that is, by forty-eight states, as well as by the nation.

To an important extent the relief from the injurious effect of the regulations of the "many masters" may come from the Interstate Commerce Commission exerting emphatically the powers conferred upon it by the Interstate Commerce Act and recognized and enforced in the Shreveport case.

With reference to matters outside of the scope of the Interstate Commerce Act, injurious state action in extreme cases may

be set aside by the Supreme Court of the United States on the ground that such action constitutes such a direct burden upon commerce among the states as to be unconstitutional even in the absence of action by Congress. It is not impossible that the increasing appreciation of the intimate relation between the credit of a railroad company as a whole and any substantial impairment of that company's net income by any state will lead the Supreme Court to afford an increasingly important protection even in the absence of action by Congress.

But the extent to which the Interstate Commerce Commission may go and the extent to which the Supreme Court may go are for the present matters of doubt and uncertainty, to be developed very slowly through a long period of years. Meanwhile railroad credit, which for any one company is a single and indivisible thing of paramount importance to the nation, is being menaced by the claims of power and by the exercise of power by forty-eight masters in addition to the nation itself. The condition is one which calls for further comprehensive and thorough Congressional action, which, of course, should not be taken except after a profound study of the situation in all its bearings. But the beginning of that study by Congress ought not to be delayed.

STATE LEGISLATION RELATING TO OPERATION

From the Railway Age Gazette.

The Special Committee on Relations of Railway Operation to Legislation has issued Bulletin No. 73, including a table similar to that which has been issued in previous years, showing the classification of bills introduced and laws enacted relating to railway operation in the state legislatures which were in session in 1915. The statement shows that while the number of bills of this character introduced continues to be large, the number of laws enacted is considerably less than in 1913, the last year when most of the legislatures were in session. In 1915, 43 legislatures were in session and the number of bills introduced was 1,097, while the number of laws enacted was only 137. A comparison with the four preceding years is shown in the following table:

	1915	1914	1913	1912	1911
Legislature in session	43	*14	42	*19	37
Bills introduced	1,097	236	1,395	292	512
Laws enacted	137	27	230	48	**

Bills relating to railway operation were enacted in 37 states. None were passed in Colorado, Georgia, Idaho, Utah, Washington or Wyoming of the states whose legislatures were in session. In addition to the reduction in the number of bills enacted there was also a marked change in the character of the laws passed, most of them relating to comparatively minor details of operation. The most numerous class of laws passed is grouped under the head "Miscellaneous," of which there were 27, while 154 bills of this character were introduced. The next most numerous class relates to service letters, time and manner of payment, of which 73 bills were introduced and 15 laws passed.

The most numerous class of bills introduced were those relating to employes, of which 348 were introduced and 30 became laws. Fifty-two of these related to size of crews, of which only one was enacted, this being in California; 116 to hours of service, of which 5 were enacted, in Alabama, Arkansas, Michigan, Oklahoma and

*Including special sessions.

**This data not compiled in 1911.

Texas; and 64 to terms and conditions of employment, of which 9 were passed. Eighteen bills were introduced relating to voluntary arbitration, of which 3 were passed, in Indiana, Massachusetts and Michigan. A total of 83 bills were introduced relating to equipment, of which 12 became laws, including 1 relating to cabooses in Ohio, 4 to headlights in Alabama, Missouri, Nevada and New Mexico; 1 to repair of equipment in Arkansas and 6 to appliances required, in Arkansas, California, Connecticut, Maine, New Hampshire and Ohio. Seventy-nine bills were introduced relating to passenger trains, of which 11 became laws. These include 5 relating to the equipment of passenger trains, in Florida, Illinois, Kansas, New Hampshire and Rhode Island, out of 38 bills introduced, and 2 bills relating to the makeup of passenger trains, in Connecticut and Vermont, out of 4 introduced. There were 48 bills introduced relating to freight trains, of which only 2 were passed.

A total of 23 bills relating to cars were introduced, of which 3 were passed; 17 bills related to the furnishing of cars, of which 2 were passed, in Minnesota and in North Dakota, and 6 relating to demurrage and storage, of which 1 was passed, in Vermont. There were 11 bills relating to block and other signals, of which 1 bill relating to block and interlock was enacted into law in Arkansas, and 1 relating to switch lights in Missouri. There were 9 bills relating to clearances, of which 2 were passed, in Kansas and in Minnesota, 78 bills relating to crossings, of which 12 were passed, 17 bills requiring crossings, of which 5 were passed, in California, Kansas, North Carolina, South Dakota and Wisconsin. Twenty-six bills relating to crossing protection were introduced, of which 2 were passed, in Indiana and in New York, 35 relating to the separation of grades, of which 5 were passed in Indiana, Michigan, New York, South Carolina and Vermont. There were 64 bills introduced relating to maintenance of way, of which 10 were passed; 75 bills relating to stations, of which 11 were passed; 13 relating to hospitals and relief departments, of which 3 were passed; and 10 relating to the payment of claims, of which none were passed. Forty-three bills were introduced relating to trespassers, of which 3 were passed, in North Dakota, Vermont and West Virginia, and 11 relating to the destruction of property by trespassers, of which 5 were passed. There were 5 bills introduced relating to the reporting of accidents, of which 1 was passed.

California heads the list as to number of laws passed in any state, with a total of 14 out of 51 bills introduced. In Texas 8 laws were passed out of 36 bills introduced, and in Kansas 7 laws out of 64 bills introduced. The largest number of bills introduced was in Kansas, with 64. In Minnesota 60 bills were introduced and only 4 passed, and in Missouri 56 were introduced and only 5 passed.

THE GOVERNMENT AND THE RAILROADS*

BY OTTO H. KAHN.

The conflicts and the storms which have raged around the railroads these many years have largely subsided. Abuses which were found to exist, though it is fair to say that for their existence the railroads were by no means alone to blame, have been remedied and their recurrence made impossible. The people's anger has cooled and, though some politicians still sound the old war-cry, many indications (such, for instance, as the recent popular vote against the Full Crew Law in Missouri) tend to show that the people desire to have the railroads fairly and justly dealt with, exacting and expecting from them a reciprocal attitude, treatment, and spirit. Railroad executives have come to recognize their functions as those of semi-public officers owing accountability no less to the public than to the shareholders of the particular property they represent. A system has been evolved which, while preserving for the country in the conduct of its railroads the inestimable advantage of private initiative, efficiency, resourcefulness and responsibility, yet through governmental regulation and supervision emphasizes and protects the community's rights and guards against those evils and excesses of unrestrained individualism which experience has indicated. It is in every way a far better system than government ownership of railroads, which, wherever tested, has proved its inferiority, except only in Germany, and the very reasons which have made government ownership measurably successful in Germany are the reasons which in America would make it nothing short of an economic calamity, being given political and other circumstances as they now exist and are likely to continue to exist for a long time to come.

The system as it has evolved itself in America, though it is resented by some of the Bourbons as far too advanced and as an indefensible interference with the rights of property, and by some of the ultra-radicals as not going far enough, seems to me in theory an almost ideal one. But the best of theories is futile if its practical application is at fault; and I know of few more flagrant instances of the unwise and unsound application of a wise and sound theory than in the case of our railroad legislation. Indeed, the structure

*From "The World's Work," February 1916.

of federal and state laws under which American railroads are compelled to carry on their business at present is little short of a legislative monstrosity. Writing on the subject of control and regulation of corporations, Colonel Roosevelt in a recently published article expresses himself as follows:

* * * When we control business in the public interest we are also bound to encourage it in the public interest, or it will be a bad thing for everybody and worst of all for those on whose behalf the control is nominally exercised. * * *

This object cannot be accomplished by a chaos of forty-eight states working at cross-purposes in the development of our interstate and international industrial fabric. * * *

So much of the regulation attempted in our country in the past has been done by demagogues or by heedless politicians interested only in their own momentary political success that the very name Regulation has become an offense and an abomination to many honest business men.

* * *

There is no parallel I know of in any other country to its greatest industry being placed, down to its minutest details, under the almost autocratic power of seven men owing defined accountability to no one, selected for relatively short terms and according to no particular standard of training or qualifications, and being practically free from control, restraint, or appeal. But it is not so much the existence of that power, excessive though it be, of which the railroads complain; in fact, not a few railroad men have come to be reconciled to the theory on which it rests and even to consider the underlying principle a wise and beneficent one. Practically all, I believe, recognize that thorough public regulation has come to stay. It is the faultiness and inadequacy of the law under which the Interstate Commerce Commission works and exercises its power and the multiplicity of masters under whom the railroads have to serve and whom they have to satisfy that constitutes the main burden of their grievances and that cries for reform.

THE INTERSTATE COMMERCE COMMISSION.

That the Interstate Commerce Commission, being at the same time prosecutor, judge and jury, combining in itself legislative, executive and judiciary powers, is a negation of the root principle from which the American system of government springs, may be stated as an incontrovertible fact. Such combination of powers in one body has been styled by James Madison "the very definition of tyranny." The evil or impropriety of such a union of conflicting or at least inconsistent functions has been publicly acknowledged by a

most unimpeachable witness, namely, one of the ablest members of the Commission itself, Hon. Charles A. Prouty, in an address delivered in 1907, from which the following extract may be quoted: "If the Interstate Commerce Commission is vested with a jurisdiction so tremendous in extent and of such finality, every effort should be made to provide a body adequate to the trust. * * * I very much doubt whether the same body can properly discharge both these functions (executive and judicial). In the end it will either become remiss in its executive duties or will, in the zeal of these, become unfit for the dispassionate performance of its judicial functions. Whatever may have been true in the past, the time has come when the Commission should be relieved of all its duties except the hearing and deciding of complaints." If this was true in 1907, how much more true and urgent is it today, considering the immense amplification and extension which the Commission's powers and functions have received since then? And has "every effort" been made "to provide a body adequate to the trust?" I am far from underrating the great ability, vast industry, and devotion to duty of the men now composing the Interstate Commerce Commission, nor do I share in the not-infrequently-heard opinion that they are hostile to the railroads on principle, believing as I do, on the contrary, that they are earnestly striving to do justice according to their conscience and judgment and are bravely struggling with a simply intolerable burden of work and responsibility. But it cannot be gainsaid that to this Commission which has greater power and greater responsibilities concerning the industrial life of the nation than probably any other tribunal anywhere in the world exercises there has never yet been appointed a man who came to it qualified by first rate experience in railway operation, or by broad business experience, or any considerable experience in financial matters. Nor can it tend toward providing "a body adequate to the trust" that the members of that body, called upon to deal with questions of momentous import and most intricate complexity, should be appointed for short terms and be paid salaries so modest as to make acceptance of such appointment a very great financial sacrifice to men of first rate ability, and prolonged continuance in office an injustice to their families.

THE COMMISSION'S OVERWHELMING TASK.

I doubt whether anywhere else can be found a body of seven men on whom devolves the staggering, crushing, stupendous mass

of work which is laid upon the Interstate Commerce Commission. If it were composed of the wisest, most expertly trained minds and most vigorous working capacities to be found in this or any other country, it would be impossible for it to accomplish the superhuman task which Congress, in its eagerness to rid itself of troublesome problems, has piled and keeps piling upon it. According to its annual report for the year ending October 31, 1915, the Commission during that year conducted 1,543 hearings, in the course of which it took the almost incredible total of 200,438 pages of testimony, and it must be borne in mind that this is only the preliminary work, the groundwork on which its deliberations and decisions are based. Within that period of twelve months the Commission furthermore heard oral arguments in 198 cases (sitting 103 days for that purpose), decided 902 cases upon its "formal docket," entered upon its "informal docket" 6,500 separate complaints and upon its "special docket" 6,690 applications, made 822 orders under the "long-and-short-haul-clause," etc., and had filed with it no less than 149,449 rate schedules. The Committee's report states that

A mere recital of these figures scarcely gives an adequate idea of the volume of work disposed of and the enormous interests involved in the cases that come before the Commission.

In addition to the activities above summarized, it undertook numerous prosecutions besides transmitting many cases to the several United States district attorneys, gathered statistics, collected information, made investigations, answered Congressional inquiries and conducted a correspondence of overwhelming dimensions.

It is a physical impossibility for each of seven men to read carefully 200,438 pages of testimony in a year, even if they had nothing else to do. Yet the Commission not only has to decide cases in which 200,438 pages of testimony have been taken, but it has to hear as many arguments as are heard by the Supreme Court, grant or refuse almost countless exemptions from general rules established by Congress, initiate and supervise criminal prosecutions, conduct a great detective bureau for the purpose of discovering infractions of the statute, formulate a complex system of accounts and adapt it to changing conditions or changing conceptions of public policy, supervise the accounting of more than two thousand corporations, inspect the physical apparatus employed in railway transportation and devise means for its improvement, enforce regulations concerning hours of labor, determine what water facilities railway corporations may oper-

ate and perform numberless other duties of arduous character and vast importance. It has further to regulate telegraphs, telephones, pipe lines and express companies and to grapple with the formidable task of making a physical valuation of the railroads. For years, Congress has thrust upon the Commission one function after another until it is simply overwhelmed. The result is not merely delay and insufficient time for deliberate consideration but the necessity to relegate the hearing and investigation of many important cases to clerks or agents; and, with every desire on the part of the commissioners for the conscientious discharge of their duties, the views and conclusions arrived at by such subordinates must necessarily have a large, if not a controlling, influence on the decisions of the Commission.

It is a regrettable but undeniable fact that no discussion of the difficulties and unjust burdens laid upon the country's greatest industry would be complete without making mention of the action of the Postmaster General in compelling the railroad to accept grossly inadequate compensation for carrying the mail and the parcel post. If any large corporation were to take advantage of its position and power as the government does in this instance, it would not take the Federal Trade Commission long to denounce such practices and to compel redress for the aggrieved party.

THE PREDICAMENT OF THE RAILROADS.

If this presentment exhausted the grievances of our railroad industry it would be serious enough, but it is very far from exhausting them. Indeed, the most serious grievance is the fact that in addition to the activities of state legislatures there are not less than 43 state commissions, exercising varying degrees of power over railroads, guided in their decisions by no precedents or fixed rules, their jurisdiction and their decrees intertwining, conflicting with, upsetting those of each other and of the Interstate Commerce Commission. In 22 of these 43 states the commissioners are chosen by popular vote, their terms ranging from 2 to 6 years, their salaries being generally very moderate, down to as low as \$1,500 per annum. It is not surprising that the authority of such State Commissions, of which it would be too much to expect or even to ask unyielding imperviousness to the public pressure, should have been exercised, in not a few instances, frankly for the selfish interest of each state,

somewhat on the lines of creating through the fixing of state railroad rates and otherwise the equivalent of a protecting tariff or of an export bounty for the benefit of the industries or the consumers of each particular state. Nor will it be wondered at that there have been instances of a tendency to use the Commissions' authority over the issue of stocks and bonds toward forcing the railroads to spend part of the proceeds for purposes which to the commissioners appeared advantageous for their particular state or certain localities therein. The following illustration is taken from the annual report of the Southern Pacific Company:

To provide funds for corporate purposes, arrangements were made with bankers, in May, 1913, for sale of two-year notes at a very satisfactory price. Authority of the California Railroad Commission to issue the notes was obtained without delay; approval by the Arizona Corporation Commission, however, was withheld, pending certain assurances and guaranties on the part of the Company with reference to the conduct of its business in Arizona which it was not warranted in giving, and, during the time the matter was pending before the Commission, the condition of the money market had so changed that a sale of the notes could not be made. Further consideration of a two-year note issue was abandoned, and one-year notes were issued instead, and sold at a price yielding approximately \$275,000 less than would have been received had the two-year notes been issued without delay. Under the laws of California and Arizona the issue of one-year notes did not require Commission approval.

In several cases the carrying out of suggestions made by the Interstate Commerce Commission to the railroads with the view to enabling them to obtain more adequate revenues was peremptorily stopped by State Commissions which ordered the railroad not to do the very things which the Interstate Commerce Commission had told them they should do and had criticised them for not having done before.

In the "Eastern rate case" the Interstate Commerce Commission found that the carriers' revenue was inadequate and insufficient, but declined to grant the greater part of the increase asked for, largely on the ground that there were other ways open to the railroads to augment their income. The Commission pointed out these ways in considerable detail, but when the railroads took action in accordance with the indications or directions thus given, they were, as to the most important of them, promptly stopped by State Commissions, court decisions and even by the Interstate Commerce Commission itself from doing the very things which the Interstate Commerce Commission had told them to do and the feasibility and propriety of which it had given as a reason for not granting the rate increases asked for.

The following extracts from a most interesting and instructive address recently delivered by Alfred P. Thom before the State Bar Association of Tennessee may appropriately be quoted in this connection as illustrating the activities of state bodies :

Three States have passed laws making it illegal for a carrier having repair shops in the State to send any of its equipment, which it is possible to repair there, out of the State for repairs in another State, fifteen States have attempted to secure preferred treatment of their State traffic, either by heavy penalties for delays or by prescribing a minimum movement of freight cars, some of them requiring a minimum movement to fifty miles per day, whereas the average movement for the United States is not more than twenty-six miles per day—one of these States imposing a fine of ten dollars per hour for the forbidden delay; twenty States have hours-of-service laws, varying from ten to sixteen hours; twenty States have full-crew laws; twenty-eight States have headlight laws, with varying requirements as to the character of the lights, and fourteen States have safety-appliance acts. Sixteen States have enacted statutes, each asserting for itself the individual right to control the issue of stocks and bonds of interstate carriers.

It is manifest that, if such issue is to be regulated by the individual States, every State is at the mercy of the others. A bond, to be available in the market, must, as a rule—especially now when most bonds are necessarily junior liens—be secured upon the whole railroad line; and this crosses many States. One of the States, therefore, if it possesses the power to regulate the issue of securities of an interstate carrier, may defeat a financial plan approved by all the other States and necessary to the carrier's transportation efficiency. * * *

In other words, the greediest, the most selfish, and the most unreasonable State thus secures by its own laws a preference for its own commerce over the commerce of its sister States and over interstate commerce itself.

A MASS OF CONFLICTING LEGISLATION.

What with the regulating activities of 43 Commissions besides the Interstate Commerce Commission, the adoption by state legislatures of rate-fixing measures, extra crew bills, and all kinds of minute enactments (between 1912 and 1915 more than 4,000 federal and state bills affecting the railroads were introduced and more than 440 enacted), the enormous increase within the last seven years in federal and state taxation, the steadily mounting cost of labor, the exactions of municipal and county authorities, etc.—it will be admitted that the cup of railroad difficulties and grievances is full. I am far from holding the railroads blameless for some of the conditions with which they are now confronted. Not a few of them were arrogant in the days of their power, many mixed in politics, some forgot that besides having a duty to their stockholders they had a duty to the public, some were guilty of grievous and inexcusable financial misdeeds. But, in their natural resentment and their legitimate resolve to guard against similar conditions in the future, the people have overshot the mark. The proof of the pudding is

in the eating. Not less than 82 railroads, comprising 41,988 miles and representing \$2,264,000,000 of capitalization, are in receivers' hands, and the mileage of new railroad constructed in 1915 is less than in any year since the Civil War. The duration of receivership has become longer and longer, far longer than it used to be, owing to the difficulty of raising the necessary funds for the rehabilitation of the properties and for taking them out of receivers' hands, which difficulties are largely due to the complications and delays resulting from the jurisdiction and views of State Commissions. Thus the Wabash Pittsburgh Terminal has been in bankruptcy since May 29, 1908, the Wheeling & Lake Erie since June 8, 1908, the St. Louis & San Francisco since May 27, 1913, the Wabash from December 26, 1911, to November 1, 1915, and so forth. Railroad construction has practically stopped, the purchases by railroads have been reduced to a minimum, so much so that, had it not been for the windfall of the "war orders," our steel and cognate industries would have faced an exceedingly serious situation. Railroad credit has become gravely affected. It is true that faults of management and disclosures of objectionable practices have been contributory causes in diminishing American railroad credit, but from my practical experience in dealing with investors I have no hesitation in affirming that the main reason for the multiplication of railroad bankruptcies and of the changed attitude of the public toward investing in railroad securities is to be found in the federal and state legislation of the years from 1906 to 1912 and in what many investors considered the illiberal, narrow and frequently antagonistic spirit toward railroads of Commissions charged with their supervision and control. The fortuitous and fortunate circumstances that, owing mainly to the direct and indirect effect of the stimulus of huge war orders and because of other unusual circumstances, railroads are doing much better at present, and that investors, after having left railroad securities more or less severely alone for years, are, for the time being, looking upon them with a friendly eye, should not make us lose sight of the underlying fact that the railroad industry is in an inherently weakened condition, that the spirit of enterprise has largely gone out of railroading that, generally speaking, expenditures for construction, equipment, improvements, etc., are confined to the absolute necessities. Nor must the present prosperity of the country blind us to the consideration that the full measure of prosperity which it is capable of attaining or, indeed, any permanent

and comprehensive progress or prosperity cannot be reached as long as its most important industry, that of railroading, is bureaucratized, shackled, harassed and lamed.

Incidentally it may be mentioned that if the expenditure of time, thought and effort which the numberless and intricate requirements of the Commissions impose on the chief executives of our railroads, together with the expenditure of cash for lawyers and for a fair sized army of officials and clerks to handle the work incident thereto, could be computed in the aggregate as to time and money, the resulting figures would be appalling. I have known of cases where for days at a time all the higher officers of a railroad were taken away from their work, having to attend hearings instead before Commissions in various parts of the country. It is an unquestioned fact that the feeling of being hampered and harassed by incessant and minute regulations, of having to go to Commission after Commission in order to obtain the sanction of a bureaucratic regime for almost each and every step, has resulted in chilling the spirit of initiative on the part of those in charge of our railroads, has diminished their desire for and satisfaction in creative activity and has lessened the inducement for ambitious and capable young men to embrace the career of railroading.

Considered from whatever point of view, the conclusion seems to me unavoidable that American railroad legislation, whilst sound in theory, is in practice a patchwork, a makeshift, and grossly and fundamentally faulty. It has been added to, modified, tinkered with session after session in national and state legislatures; it is illogical, unscientific, confusing, vexatious, and generally intolerable. The Interstate Commerce Commission and 43 state bodies acting at once as lawmakers, prosecutors, judges and juries hold the destinies of the railroads in their hands, with the power almost over life and death—a power not much short of autocratic, for it is subject to little, if any, executive control and, as far as the Federal Commission is concerned, to practically no effective judicial review. Unlike the courts they are bound by no precedents and rules of procedure, guided by no fixed and well understood principles or rules of decision. * * *

SUGGESTED REMEDIES.

Railroads, being essentially nation-wide in their functions, should, as to rates and other phases of their business directly or indirectly

affecting interstate results, be placed under one national authority instead of being subject to the conflicting jurisdiction of many different states—a jurisdiction the exercise of which is always subject to the temptation of being used unfairly for the selfish and exclusive advantage of the respective individual states. State Commissions have their proper and important functions in the supervision and regulation of street railways and of public service corporations other than interstate steam railroads, and even in the case of the latter in the exercise of certain administrative, police, or public welfare powers within well defined limits. But the fundamental law of the land, the Federal Constitution, expressly reserves to Congress the exclusive power of dealing with commerce between the states. * * *

A HELPFUL POLICY NEEDED.

It is vital to our railroads that investors be reassured and encouraged as to the safety and attractiveness of investment in American railroad securities, particularly also in view of the world-wide competition for capital which, sooner or later after the close of the European war, is likely to set in. A more liberal and helpful policy toward railroads should be inaugurated and a greater margin of net earnings secured than can be obtained under the existing rates in normal times; and in this connection it must be borne in mind that such margin must include a sum over and above what would be a reasonable dividend because the nature of the railroad business makes the accumulation of a substantial surplus a necessity for every properly managed line. A railroad can never be considered a finished product. Expenditures are continually required and not few of these outlays, such as for the elimination of grade crossings, better station buildings, etc., produce no direct revenue. A trifling fraction of a cent added to rates means a vast difference to the railroads applied to the huge total of their traffic, whilst very little felt by the shipper or producer, and hardly, if at all, by the consumer. The test for proposed rate increases should not be whether a case has been made out according to some rigid doctrinaire standard, but whether it has been made out according to reason and equity and broad considerations of business fairness and of public interest which includes the preservation of railroad credit and due regard for the vast and far reaching importance of the railroad industry. It is not too much to say that on the policy and attitude of Congress and the governmental authorities, on the encouragement or discour-

agement afforded by them, largely depends the answer to the question whether or not railroad development is to keep pace with the country's potentialities and opportunities. Capital cannot be commandeered. It is proverbially timid and its owners will not venture forth into a field where they must be in doubt from one year to the next as to what new exactions, burdens and restraints may be placed upon the properties in which their investment is placed. If railroad officers are to plan for the future in a large and far-reaching way, if an adequate supply of capital is to be forthcoming for the extension and development of our railroads commensurate with the opportunities before our farmers and merchants and with the vast size and promise of our undeveloped areas, there must be not only reasonable liberality but above all reasonable stability of policy. In other words, the railroad questions must be taken out of politics.

The present lopsided structure of railroad laws ought to be demolished and superseded by a new body of laws designed, not to punish the railroads, but to aid them toward the greatest development of usefulness and service to the country, conceived upon harmonious, carefully considered, scientific and permanent lines.

* * * The banking and currency legislation of 1913 affords an appropriate precedent and in many respects a parallel. The national functions and character of the railroads are largely analogous to those of the national banks. Like the national banks, so should the railroads be freed, at least in essentials, from the conflicting and multitudinous jurisdiction of the several states and placed under federal authority. And just like the national banks, they should not only be permitted but be compelled to co-operate, and thus mobilized for the maximum extent and efficiency of service; in other words, pooling and kindred arrangements should be sanctioned, subject to the approval of the Interstate Commerce Commission. The formula and principle of the banking and currency legislation, viz., a strong, effective and controlling Central Federal Board in Washington, relieved from detail work and from certain essentially conflicting functions (which should be conferred upon a separate body) with Regional Boards according to geographic groupings, might prove exactly suited to railroad legislation. Red tape should be cut wherever possible, bureaucratic interference limited, and, to the extent that it can safely be done without jeopardizing the due protection of the interests and rights of the public, freedom should be given to the railroads in the conduct of their business coupled with strictest

individual responsibility and fullest publicity. Railroads should be freed from the unfair, unreasonable, and illogical situation of being subjected, as they now are, at one and the same time to special regulatory and supervisory legislation, and to the inhibitions of the Sherman Anti-Trust Law, which is based upon a theory and designed to serve a purpose essentially contradictory to the theory and purpose of our existing railroad legislation. Furthermore, the same body which determines earnings by fixing rates should be charged with the responsibility of hearing and determining wage disputes between railroads and their employes, or if that be not practicable then at least with the duty of giving full weight and consideration to all factors that go to enhance the cost of operating railroads, such as legislative enactments like the full crew law, increased taxation, advances in wages, and so forth.

The situation resulting from the European war has brought to this country a scope and a wealth of opportunity almost, if not entirely, without parallel in history. * * * But there is no great opportunity without a corresponding duty, no privilege without a corresponding obligation to use it wisely and beneficently. To fulfil with credit and honor, with due advantage to itself and the world, the part which the favor of Providence has allotted to America is a weighty and solemn task. It calls for thoroughness of thought and study, integrity, self-restraint, and conservatism, boldness, enterprise and adaptability, breadth of vision coupled with attention to details, and last, but not least, wise and mutually trustful co-operation between business and the legislative and administrative powers—such as exists as a matter of course in most if not all of the great nations of Europe. By all means let us have vigorous governmental action, legislative regulation, administrative control whenever and in whatever ways, after mature and dispassionate consideration, it appears best in the interest of the country. But do not let us have paternalistic regime, ignorant interference, partisan motives, political viewpoints, narrow technicalities. Let us carefully refrain from so hampering and confining the activities of business men as to lame the initiative, weaken the self-reliance, chill the enterprise and zeal and joy of work which have always been their characteristics and which have so greatly contributed toward the marvelous development of this country. * * *

THE BEGINNING OF A NEW ERA.

I know of no finer or more honorable body of men than the presidents of our American railroads. There is not one of them now in office who owes his position to inherited advantages, to protection, to anything, in fact, but his own qualities of mind and character. With few exceptions, the men in active charge of large businesses or corporations in this country have made their own positions; the vast majority started at or near the bottom of the ladder. There is no center in the world where the label counts less, where it is less possible to bequeath position, however backed by wealth, where the shine and effect of a great name is more quickly rubbed off if the bearer does not prove his worth, where the acid test of personal efficiency is more strictly applied, where merit is more certain to come to the top, than in the great mart of American business. And there is no country where the capacities of representatives of business are so little availed of in governmental and political affairs, their views so little heeded and so frequently rebuffed, where legislation affecting economic, industrial and financial matters is framed, and the resulting laws administered with such disregard of the counsel and expert knowledge of business men as in the United States. * * *

Fortunately, there have been indications within the recent past which justify the hope that this condition of affairs is about to change and that prejudices and antagonisms which have been prevalent all too long are beginning to give way to more auspicious relations. As corporations have learned the lesson that their well-being depends upon their so conducting themselves as to deserve the goodwill and support of public opinion, so the people have learned that their own prosperity and the prosperity of the basic industries of the country are interdependent. The matter and manner of the passage of the Federal Reserve Act, the spirit and method of its administration, the co-operation between the treasury and the banking community during the first few months of the European war, by means of which what threatened to become a most serious situation was met and successfully overcome, several public declarations of President Wilson, the activities of the administration in co-operation with business men, aimed at enlarging our commercial and financial intercourse with South and Central America and other countries—all these and other instances that might be mentioned are

evidences of a new spirit expressing itself on broad and constructive lines. Our railroad legislation, on the other hand, and, in frequent instances, its administration, remains a glaring example of the opposite spirit, and our railroad industry cannot permanently prosper, nor can it render the full measure of service which the vast development ahead of the country calls for until relief is given to the railroads from the legislative and administrative conditions which now hamper, restrain and oppress them. * * *

PUBLIC INTEREST IN TRANSPORTATION*

BY WM. SPROULE,

President, Southern Pacific Company.

The public interest in transportation is as keen as it is misinformed. The public interest in transportation really rests in the one word service. To meet the public interest service must be adequate to the public needs. To be adequate to the public needs it must be safe; it must be frequent and varied enough for the requirements of commerce and of travel; flexible enough to fit the varying wants of specialized business; it must be maintained at a standard high enough to be dependable; and in all it must be an energetic auxiliary for business and the pioneer of business by extension of service as needed. This is true whether the transportation be municipal or interurban, state or interstate, gasoline or electric, by railroad or by steamship.

One of our difficulties is that the subject when thus regarded looms so large as to extend far beyond the horizon of most minds. This produces a confusion and bewilderment that have for their result discursive generalities upon what people are pleased to call broad lines, only because they talk in a loose way upon subjects beyond their comprehension. We throw broad phrases as a blanket over our ignorance. The fact is the public interest in transportation is different from the interest the public takes in transportation questions in these times.

The public interest is the greatest of business interests. The great business organization which we call the public is bigger than all the so-called big interests put together. If casually we think that what we call the public is not a great business organization the mind has merely to revert to times of great crisis such as the San Francisco fire of 1906 when the business organization of the public in that municipality was completely dislocated and broke down, when a \$100 bill or a \$20 gold piece had no purchasing power for the time being; men were fed by a supporting and controlling and nurturing hand, themselves helpless in the emergency.

*Address before Traffic Club of Chicago, Feb. 25, 1915.

The delicate interlacing of common interest in periods of public tranquility enables us to move along our daily paths of conduct so easily that we are apt to forget that the public interest is a great business interest. And so, as a great business interest, it demands that transportation shall be safe and flexible, adequate and helpful. The public interest requires that the means of communication upon which civilized mankind depends shall be effective for the purposes of the community, the state and the nation. Transportation to attain to all these requirements must of necessity be maintained consistently at a high standard; these standards must be advanced to fit the advancing standards in all business, and it must reach out with energy in anticipation of the growth of business and the extension of business into new fields. That is to say that the public interest puts upon transportation the obligation of service. The public interest demands, and with increasing insistence, that the transportation companies serving it shall be the best in the world, because serving the most active-minded, energetic, restless and most insistent people in the world.

Wherever civilization exists the go-ahead spirit of the American people is proverbial. Like every other proverb this one has its exception. That exception is transportation. American transportation has lost its momentum. The go-ahead spirit which animated it and made it one of the American characteristics has been crushed. The finest thoroughbred, spirited and eager in the hands of him who understands, becomes drooping and dispirited under stupid abuse and cudgeling. It has been well said that a nation never stands still, it goes either forward or backward; that an individual never stands still, but either makes progress or lags behind. So with business. Inevitably so with transportation, and transportation is not going forward. The American flag is disappearing from the seas. Within the ten years ending with the close of 1913 the tonnage moved in the United States grew by 78%, the tonnage of perishables by 106%, while during that period railroad construction increased but 17%, and with the opening of this year had slowed-down almost to a dead stop. Today railroad construction in the United States has ceased except to finish a few odds and ends.

As to the railroads we have, they are under the heavy hand of repression. The public attitude with respect to them has very little to do with the public interest. The kind of interest on the part of the public which is aroused by the platitudes and prejudices

voiced from ten thousand political platforms is at variance with what is really to the public interest. These harangues which find widest circulation, prate about a very few phases of the transportation question, and minor topics are magnified for the popular eye to look like big things. Such topics as discrimination, watered stock and over-capitalization, and influence upon politics, have the changes rung upon them until the popular imagination is stirred into the belief that the most useful agency ever placed at the service of man, for the widening of civilization and the interchange of products and manufactures, has by some mysterious process become a serious menace, placing in jeopardy the public interest. The fact is ignored that regulation was established more than a quarter of a century since and has constantly been in active operation from that time. This regulation was established primarily to suppress practices savoring of discrimination, which had developed from free and unfettered competition. Up to that time competition prevailed in the transportation business with the same freedom with which it prevailed in all industrial and commercial lines of activity.* Railroads sought business as any merchant sought it. The railroad went after business upon the principle of capturing the customer and upon the many different terms necessary to accomplish that purpose. Every railroad tried to get the better of every competing railroad, every shipper tried to get the better of every other shipper. The shipper played upon the jealousies and competitive fears of the railroads, the railroads worked upon the cupidity of the shippers. The pressure of competition as between the railroads on the one hand and the pressure upon the railroads for favors on the other hand constituted an attitude of the times which was common to all business. It was largely held that it was a natural law of business. Much of the calculation of the railroad and the shipper alike was based upon the wholesale principle as distinct from the retail, and upon distinction between important customers and less important customers, just as a merchant sells to one customer subject to certain discounts and to another customer subject to still further discounts when the latter is a more important customer, is more valuable, and perhaps is a closer trader. To the public imagination the conditions that belong to those times have been held up as evidence of high crimes and misdemeanors upon the part of the railroads, but neither the railroads nor the shippers regarded them as immoral in conception or illegal in performance. These practices had their origin when

there were no laws on our statute books leveled against them, and were so generally accepted as part of the ordinary business of the time that for a considerable period after the law was devised having for its purpose the correction of these practices the law remained deliberately unenforced, because those charged with its enforcement regarded enforcement as unpopular and inexpedient. Finally legislation and regulation put the stamp of criminal illegality upon all such practices and they are as extinct as the dodo, excepting for unintentional and foolish lapses which form exceptions so unusual as to be instantly conspicuous. It is well that those practices have been abolished. Neither the railroads nor the shippers could themselves abolish them. Both the railroads and the shippers were dealing with competitive conditions as they found them; they could not control the conditions; and regulation in this regard has undoubtedly been in the public interest. Notwithstanding all this, the railroads have been subjected for years to such misrepresentation and such scandalous abuse that the public mind has become infected with the notion that somehow or other the railroads were in these things guilty of high crimes and misdemeanors for which they should still have punishment inflicted upon them.

Another favorite topic for the delectation of the public is discrimination between communities. This can be dismissed with the obvious statement that with regulation dominant in almost every state of the Union and in national effect since 1887, that which is alleged to be discrimination is championed as ardently by the communities or sections who believe themselves favored by such discrimination and claim it to be their lawful right as it is violently opposed by those communities or sections who hold the opposite view. That is to say that it is not a railroad question at all; it is a local question of conflicting local ambitions; and after so long a period of active regulation by the authorities of government it can fairly be claimed by the railroads that their existing tariffs and practices should *prima facie* be deemed fair and reasonable and the burden of proof should be distinctly upon the complaining parties, whose evidence should be overwhelming and conclusive. Courage in high places will yet accomplish this, and so get rid of one element of disturbance that affects business.

As to that other favorite topic, watered stock and over-capitalization. Physical valuation of the railroads is under way by the Federal Government and by various of the states. If valuation of

the property has definite relation to the rates which may be charged for transportation it is evident that in raising at this time the question of over-capitalization loose and careless chatter is made to serve as a substitute for, and to anticipate, the serious findings of government. To this laborious duty the government is already devoting itself with commendable zeal, and the more fully the transportation companies co-operate with the government in information and aid the more quickly and more exhaustively will the government reach those conclusions which are in the public interest, and which in the meantime should in all fairness relieve the railroads of judgment against them on the general question of capitalization wherein the exception is exalted as the rule. Especially should this be as the transportation companies look forward with confidence to the outcome of the inquiries by the government as affording them a basis for better credit and consequently for greater usefulness.

The railroads are further accused of influencing politics. It is strange indeed that by popular will the railroads are denied access to the forum which makes their laws, determines their tribunals, fixes the basis for their taxes, and even designates by enactment many operating and physical expenditures which belong to the domain of management. Method for presenting the case of the transportation companies in the seats of legislation may in various ways and at various times have been defective, but not more so than the proposals and methods which the transportation companies believed it to be their right and duty to combat. The railroads can fairly maintain the general principle that they have the right to go openly and plainly into the foreground against enactments or proposals for enactment inimical to the transportation companies, seeing that they represent 1,700,000 employes in the railroad service; not far from \$150,000,000 annual railroad taxes; are the purchasers of one-third of the steel and iron products of the country and one-quarter of its timber products, and represent billions of dollars of money invested chiefly from the savings of the people at large, including the millions of people paying premiums to insurance companies and millions more who are depositors in savings banks. It cannot be a healthy condition of the public mind which would deny to transportation thus welded with the public interest such political influence and upon the same plane as is freely and properly accorded to other activities in that great business organization called the public. As readily can we concede that those influ-

ences should not be secret or sinister but should be straightforward and fearless, and this should also be demanded of every other kind of interest affected by legislative proposals. For all of these and sundry other complaints an easy-going remedy is urged, which would take from the states, counties, cities and towns, \$140,000,000 to \$150,000,000 of taxes now turned into their treasuries by the railroads; would many times multiply complaints; would by as many times add to the difficulties of obtaining redress; would create an invincible standing political army; would substitute red-tape for initiative, and flexible fulfillment of function would give way to rigid rules.

Following upon all this misrepresentation and play upon prejudice has come a considerable period of public distrust with consequent withdrawal of confidence in the greatest industry in this country. This lack of confidence is in turn followed by general business timidity, for all business is based upon credit and credit has its foundations in confidence. It is in consequence of these conditions that we are going through a period of unemployment and distress the like of which this nation has never known. And why this unemployment? It is the habit of the time to speak of unemployment as if it related only to those who work for a specific hourly or daily, weekly or monthly, wage. It is thought of chiefly as relating to those engaged in minor places or the humbler duties of life. The facts run quite to the contrary. It is the employer who is first out of employment. As a natural sequence he is followed by the employee who next finds himself out of work. Unemployment begins only when the employer himself begins to be unemployed. When the employer is prosperous and his energies are profitably employed, employees have abundant employment and they also prosper. But why is this period of unemployment? It is because all business is bewildered and uncertain. It does not know whither it may proceed in safety. It does not know with what snares its path may be laid. This condition began with transportation and now extends to all business. A long period of misrepresentation, misunderstandings and pettifogging has so misled the public mind that throughout this country every prosperous business, indeed every organization prosperous or not which is big enough to attract the public platform performer, finds that it exists in an atmosphere of attack. The greatest trouble with this country today is that every business which has been developed by the genius of the American people has become

the object of unforeseen attack from some quarter or feels the threat or danger of attack. Our laws, which formerly were precise and definite, have blanketed business with loose generalities called crimes which the men who drew the laws and the men who interpret those laws cannot themselves define with any precision. Even when they endeavor to expound those laws they make them more obscure and more mystifying than before. The nation is filled with political economists. Business is filled to satiety with economic theories. When men ask for work they are handed an epigram. But the sad fact is that the more political theories are proposed the poorer become the people. The baiting of the transportation companies and the harrying of business have reached a point where all business is frightened so badly that the people who have savings to invest are confused and confounded, particularly inquiring whether it is safe to put their money into transportation, public utilities or into anything else that is subject to public regulation. Nor is this altered by the fact that it is in a measure unfair to the regulative theory, because regulation to be useful must not stop at the critical but must proceed to the constructive. It is designed first to regulate, but lastly to conserve. If it fail to conserve it has fallen short of its high purpose. In the meantime this hesitating and timid and inquiring spirit which has taken hold of the public in this atmosphere of attack has put a check upon enterprise and stifled development.

Although the public interest in transportation is that it should be efficient and adequate and helpful, the plain fact is that a condition exists in which almost every burden has been put upon the transportation companies that ingenuity can devise. Their expenses are increased directly and indirectly by legislation and regulative methods while by the same means their revenues are depleted and their credit put in jeopardy. This is not in the public interest. It arises largely from the experiment of undertaking on the one hand to control private capital as if it were public money, and on the other hand it arises as to expenditures from the notion that we can regulate ourselves into prosperity by increasing the number of jobs, increasing the cost of doing any and every piece of work, and deliberately reducing efficiency. There is an old saw about saving at the spigot and wasting at the bung hole. The transportation companies are in the position of waste at both, because they are permitted to control neither. It reminds us of the boy who to fit his purposes whit-

tled the stick at both ends, but at each end the whittling was a misfit and in trying to improve the job he found that his efforts at both ends whittled away the stick until there was not enough left to be useful for any purpose.

That the business interests of this country live in an atmosphere of attack is the more remarkable in that this is essentially a business nation. Yet in the uncertainties of the time amounting almost to consternation business has lost its power of initiative. The development of the transportation systems of this country and the development of its magnificent business generally furnished an example to the world of the supreme force of initiative. It has been heralded throughout the world as the American go-ahead spirit. This American initiative had its origin and vigorous development before any Government Commissions or regulative bodies were devised. That great development was under conditions which caused all men of business to exercise their utmost initiative and ingenuity and put upon transportation companies the initiative and incentive to meet the wants of business in every practicable way in order that their own business might develop. It was responsive to self-interest on every side, and in proportion as we can develop American initiative and the American go-ahead spirit which is in obedience to self-interest, in the same proportion will prosperity ensue and business grow. Let us not forget that a very important part in the growth and expansion of the general business of the nation was to be found in the growth and expansion of its transportation facilities. If the growth of the transportation facilities of this country were now proceeding in like relation to your wants as did the growth of twenty years ago, you would see a greater expansion to all business than is possible under existing conditions.

I have said that it is the public interest that puts upon transportation the obligation of service. This obligation put upon transportation obviously carries with it duties upon the part of the public imposing that obligation. It puts upon the public the duty of compensation to enable the transportation companies to provide for the expenditures necessary to accomplish the purposes demanded of transportation in the public interest. But if the public served by transportation deem it consistent with the public interest that the money for these expenditures shall be withheld, then high standards of maintenance will have to be modified, improvements will

be relegated to the realm of contemplation, and extensions remain an unfulfilled dream.

Finally, until American business generally is released from the atmosphere of attack, and the repression of business is cast aside to make way for the restoration of American initiative in its full vigor, we need not hope for material improvement in the conditions that prevail throughout this nation. We cannot whistle ourselves into prosperity. The booster lifts nothing higher than the level of his own teeth. The trumpeter of prosperity beguiles only his own ears. Prosperity is real or it does not exist. We do not have to look for it; it comes to us. It grows within our sight like a plant coming in flower luxuriant in favorable soil and genial atmosphere. It comes to us when the employer resumes employment, and it will not come to us until the people generally, whether their capacity be large or small, whether they work with their muscles or their minds (and all work requires mind), discover that their condition improves only as their employer is prosperous. There is nothing more distressing to an employer of labor than to turn away good men who desire to do good work; but until all wake up to the fact that unless the employer is prosperous the employe is failing in prosperity, we will have little improvement. When we have learned the lesson that in this nation we are simply a big industrial family in which we all prosper together or we do not prosper at all, we will then have promise of relief from the misunderstandings and cajolements which increase unemployment and destroy the comfort and the prosperity of the average man.

There may be much in what I have said that savors of past issues, but it is desirable that we should get rid of misapprehension as to past relations and expose every unfair denunciation. When misapprehension is prevalent and misunderstandings are rife it is the duty of every man connected with responsible business to do his part to clear them out of the way and create a better atmosphere that we may have better conditions.

I urge the prosperity of the average man. To secure that prosperity I urge the imperative national necessity of taking business out of an atmosphere of attack into the old-fashioned go-ahead atmosphere of business initiative and American enterprise. I urge relief from the fads, fancies and isms which have filled our streets with unemployment and put away the dinner pail of the working

man empty upon the shelf in the impoverished home. I urge the restoration of confidence in the fact that American men of business are the peers of any in the world. I urge that the American workman cannot be prosperous unless the American men of business prosper. I urge that prosperity can come to us only with the full dinner pail. Finally I urge that the public interest in transportation is that it shall be prosperous in order that it may be a successful and energetic aid to all the business it is designed to serve.

The public interest in transportation is service. Poor service is dear at any price. Treat transportation generously that it may be enabled to serve you well, and those coming after you of your bone and sinew.

Gentlemen, that the President of the United States and the governors of the most progressive states of the Union are anxious students of the needs of our time gives our country happy augury and patriotic assurance that the present is a passing phase in its vast affairs. This is a business nation and when the public interest is really aroused common sense will triumph and prevail.

WHY TEXAS RAILROADS ARE IN RECEIVERS' HANDS

From the Railway Age Gazette.

Henry N. Pope, president of the Farmers' Union of Texas, recently made a statement through Texas newspapers, calling on the men who manage railroad properties to "speak out" as to the responsibility for railroad receiverships in the Southwest. Following are replies to Mr. Pope's statement made by C. E. Schaff, receiver of the Missouri, Kansas & Texas, and by W. B. Scott, president of the Sunset-Central lines. Mr. Schaff said in part:

"Commenting on the fact that railways comprising 30% of the mileage in the state of Texas, and 45% of the railroad investment in the state, are now in the hands of receivers, Mr. Pope has suggested that the people would like to have the 'plain truth from the men who manage the properties' as to the underlying causes of these receiverships. So far as the Missouri, Kansas & Texas is concerned, the 'plain truth' is, as usual, quite simple. The road's revenues, limited by federal and state agencies, have not kept pace with the increases in its expenses—increases that the management has been entirely unable to escape, and for which in most instances the management is not responsible. As a result its credit has been impaired and it has been unable to refund maturing obligations.

"Direct reply to any one of the specific inquiries Mr. Pope makes would not cover the situation. There are peculiar conditions, bearing on the financial situation of each carrier. In no case, however, would these peculiar conditions have resulted in bankruptcy except for general conditions affecting all. It is to these general conditions that thought must be directed before the present unsatisfactory condition can be corrected.

"To contend that the 'roads were unwisely built,' in the face of unanimous agreement that the Southwest needs improved, rather than impaired transportation, is useless. To say that the receiverships are due to 'manipulation by railroad financiers,' or to 'unnecessary expenses forced by law,' or to 'lack of revenue and improper expenditure,' or to 'mismanagement of the properties' would be inaccurate, even though any one of these elements may have contributed to bring bankruptcy in a special case. It is idle to disregard specific instances of 'manipulation by railroad financiers' as factors

in developing adverse public sentiment which has encouraged legislatures and Public Service Commissions to pursue unreasonable regulatory policies. It is equally idle to ignore the obvious fact that legislatures and Public Service Commissions have utterly disregarded repeated warnings by railway managers that continuing decreases in net operating returns, due to increased operating expenses without proportionate increase in operating revenues, must result in disaster.

"Whatever may be said of 'financial management' will not change the fact developed in figures compiled by the Interstate Commerce Commission that between the years 1907 and 1914 the increase in cost of road and equipment of 41 western railways was \$1,250,000,000, while between the same years there was an actual decrease in their net operating income of \$23,500,000. In short, these railroads after increasing the actual investment in their properties, had less money with which to pay a return on investment than they had before. These figures are not affected by financial management, good or bad. Increases in gross earnings have been more than swallowed up by increasing wages to employees, increasing taxes, and increasing expenditures enforced by impractical regulatory policies that have not benefited the public. In the past eight years railroad taxes have practically doubled. In the same period the gross operating income of American railways has increased only 24%, while their gross operating expenses have increased 40%.

"Federal and state agencies have operated to hold earnings down so that the carrier has had so small a margin in periods of normal business activity that his margin entirely disappeared during the depressed periods. In the case of the Missouri, Kansas & Texas, during the years from 1907 to 1914, operating revenues per mile declined from \$8,523 to \$8,241 or 3.3%. Operating expenses increased from \$5,735 per mile to \$6,469, or 12%, and operating income decreased from \$2,770 per mile to \$1,772, or 36%. In these figures are to be found the outstanding reasons for the receivership.

"The road simply has not been permitted to make earnings that would provide a return on invested capital. The same condition applies to all carriers, and it clearly explains the impairment of railroad credit. So long as the regulating authorities do not permit railway earnings that will provide proper return on invested capital, regardless of the value of the service rendered the public, the public must expect carriers to become bankrupt, just as do individuals who do not operate on proper business margins.

"Responsibility may rest on some railway managements for conditions against which the public may have complained properly. No railroad man should find fault with government effort to prevent dishonest or unfair transportation practices. Such effort constructively directed will help rather than hinder the carriers. But such efforts alone will not help carriers to provide a return on invested capital, which they must do if the present unsatisfactory condition is to be remedied. And so long as the public does not discharge its duty to see to it that the regulating authorities give the railroads fair treatment, the public should expect to assume a large share of responsibility for railway bankruptcy."

Mr. Scott said in part:

"In my judgment, the Texas roads now in the hands of their creditors are there because of the simple fact that they cannot, with the existing freight rates, meet their current expenses and give the people what the people, the legislatures and the Commissions demand. The candle must not be consumed at both ends.

"Business to be successful must earn net returns while its permanency is carefully maintained. Railroads are nowise different from commercial establishments in this respect, as witness the extent of the present receiverships in Texas and the number of roads included therein. Revenues must equal expense of operation, interest on obligations, taxes and renewals, to say nothing of rails and additional conveniences. When earnings fall off retrenchment necessarily follows, and this means fewer employes, reduction and impairment of service, and economies that sometimes seriously affect the maintenance that makes for safety and comfort, but which cannot be avoided.

"The old-time bugaboos—watered stock, over-capitalization, top-heavy bonds and incompetent administration—have no place in the operation of a trunk-line road. Mismanagement is quickly followed by a change of administration, while the roads which were established years since could not be built today for almost double the stock and bonds which represent their obligations.

"The roads which have contributed to the development of Texas were not unwisely built, even though they were projected at a time when money was scarce and when the state was barren of immediate results, the builders having only their own faith in the

prospective upbuilding of the state, based upon a knowledge of the productivity of the soil and the opportunities which awaited the man of ambition and energy.

"For the last 10 years the Texas railroads have been beset upon every side. Legislation has decreased their earning powers while increasing their expenses and liabilities. Increase in labor charges and prices of material represent additional factors that have gradually lessened the earnings, while constant manipulation of rates, rate situations and changes in jobbing and competitive centers have reduced compensation for service all along the line.

"A casual examination of the following statistics, which relate to the Sunset-Central lines only, will, I am sure, convey a few of our arguments more forcefully than any I think I could present:

"Expenditures on account of state, federal and municipal requirements and safety devices, \$2,200,000; the storm damage during the last two years amounted to \$900,000; personal injury payments, Texas, \$165 per mile in 1906; personal injury payments, Texas, \$275 per mile in 1914; personal injury payments, entire United States in 1913 constituted .985% of earnings, while in Texas during the same year this expense was 2.472% of the earnings; mail earnings per passenger train mile, 10.4c in 1906; mail earnings per passenger train mile, 7.2c in 1914; increased price fuel oil, 1915 over 1906, 109%; increase in all classes of labor from 20% to 90%, 1915, compared with 1900.

"Freight rates instead of being readjusted to conform to changed conditions have been gradually lowered in most of the tariffs until the minima are from 20% to 70% and the maxima from 10% to 50% lower than the Railroad Commission considered reasonable more than 20 years ago, while many important items of expense have doubled.

"The whole situation resolves itself into a plain business proposition. The people rightfully demand safe and reliable transportation. This means good roadbed, new ties, heavy rail, first-class motive power, good passenger cars with modern conveniences, sound bridges, comfortable depots for passengers, convenient and adequate facilities for freight. All of these cost money, more money than the average Texas road can provide under the present conditions.

"Increase in labor and material changes, taxes, personal injury verdicts, flood and storm damages, should be met by additional earnings, and as earnings are reflected in rates of transportation it follows the rates should be revised upward instead of downward, and the roads given an opportunity of meeting their obligations to the public upon a broad and fair basis. Prosecution and persecution, baiting and browbeating, should be shelved, and instead there should be put into effect a spirit of mutual understanding and help and recognition of the great community of interests which makes the railroads and the public, and particularly the farming public, positively dependent each upon the other."

POOLING BEFORE THE COMMERCE ACTS*

BY the Late CHARLES FRANCIS ADAMS, JR.

Irresponsible and secret combinations among railroads always have existed, and, so long as the railroad system continues as it now is, they unquestionably always will exist. No law can make two corporations, any more than two individuals, actively undersell each other in any market if they do not wish to do so. But they can only cease doing so by agreeing in public or in private on a price, below which neither will sell. If they cannot do this publicly, they will assuredly do it secretly. This is what, with alternations of conflict, the railroad companies always have done in one way or another; and this is what they are now doing and must always continue to do, until a complete change of conditions is brought about. Against this practice, the moment it begins to assume any character of responsibility or permanence, statutes innumerable have been aimed, and clauses strictly interdicting it have of late been incorporated into several state constitutions. The experience of the last few years, if it has proved nothing else, has conclusively demonstrated how utterly impotent and futile such enactments and provisions necessarily are. Starting, then, from this point—accepting what is and what must continue to be—the fundamental idea of the Southern Steamship and Railroad Association is to legalize a practice which the law cannot prevent, and, by so doing to enable the railroads to confederate themselves in a manner which shall be at once both public and responsible. This is the railroad side of the question. The other side of the question—that of the public—admits of a statement equally clear. Its essential point, however, is that, through this process only, can the railroad system as an organized whole be brought face to face with any public and controlling force, whether of law or public opinion. Once let the railroad companies confederate in accordance with law, and the process through which this all-important confronting result would be brought about is apparent. The confederation would be a responsible one, with power to enforce its own decisions upon its own members. The principles upon which it could act, as a creature of the law, would be formulated in the law. It could compel

*From "*The Railroad Problem*," Putnams, 1878, p. 199.

obedience, but obedience only to legal decrees, and the question in each case would be whether the decree was legal. At exactly this point the machinery for state supervision would come into play in the form of a special tribunal, like those which have already been provided in England and France, or that now being matured in the Prussian parliament. The field of discussion before this tribunal would be commensurate with the whole subject of transportation by rail, including questions not only of law, but of economy. Then, at last, the correct principles governing railroad traffic would be in course of rapid development. The essential features of what constitutes discrimination and extortion would gradually be formulated into rules, and the moment that is accomplished competition will work equitably. This result must follow. It must follow from the fact that competition is now almost entirely local. That is, a competitive rate to or from one point in no way necessarily affects rates to or from other points—a local variation does not cause the whole schedule to move up or down. This is what makes discrimination. Could the system be confederated and equalized, however, such would not be the case. An established tariff, intended to be public and permanent, would then have to be fixed upon, just as it is today fixed upon in each of the local pools which have been described. This tariff, however, would, of necessity, fluctuate throughout under the pressure of competition at any one point. For instance, a lake-rate to be met at Chicago would affect the land-rate from Louisville; if it did not, one point would be discriminated against, as it now perpetually is, in favor of the other. In like manner a river-rate from St. Louis would affect the land-rate from Chicago. Thus the principle of the all-pervading action of competition would be generally established through a confederation, as it is locally established through combinations today. In this way, full effect would be given to that natural and healthy competition which is now so successfully localized, while railroad discrimination would be effectually repressed. Discrimination being thus disposed of, it would then only remain to guard against extortion. That would not, apparently, be difficult. In the first place, it would probably be found that the effect of natural competition would, once the play of its forces was made all-pervading, afford the necessary protection. If it did not, the extortion would have to be practiced openly, and by a responsible agent upon whom the whole force of public opinion might and would be directed. Should

this fail to produce the desired effect, the central agency being responsible to the law as well as to public opinion, recourse could finally be had to legislation. Beyond this, it does not seem worth while at present to carry the discussion. The first step is, necessarily to accustom the public mind to the idea that railroad combinations possibly may be an evil only because they are unrecognized, and that the proper way to deal with them may, perhaps, be through regulation and not through prohibition.

In pursuing the discussion, however, care must be taken lest the argument against competition is carried too far, or is not properly understood. It will not do to rush from one extreme to the other. The natural question which has already been suggested must be clearly borne in mind:—Why should a railroad combination, avowedly intended to hold competition in check, if not to put an end to it, produce any result other than the natural and obvious one of raising prices?—Who or what is to protect the community against the extortions of these great corporations, should they cease to quarrel and compete among themselves?—And, in the first place, it must be frankly acknowledged that the argument against railroad competition can only be advanced subject to great limitations. Undoubtedly the fierce struggles between rival corporations which marked the history of railroad development, both here and in England, were very prominent factors in the work of forcing the systems of the two countries up to their present degree of efficiency. Railroad competition has been a great educator for railroad men. It has not only taught them how much they could do, but also how very cheaply they could do it. Under the strong stimulus of rivalry they have done not only what they declared were impossibilities, but what they really believed to be such. None the less, extraordinary as these results have been, they have been reached only at an excessive cost; a cost so excessive as to show clearly that the process is one which cannot be continued indefinitely. Under the incessant strain of competition the number of competitors is being steadily reduced. The present question, therefore, is not whether good results have ever been secured through railroad competition, but whether the same or even better may not now be secured through other and less costly processes. During the last forty years the railroad system has grown, and experience has grown with it. During that time, also, competition has to a degree expended its force, and is now obviously working its way out to a final result.

If that result is to be a legalized confederation it must be borne clearly in mind that, while railroad competition would cease, the influence of every other form of competition,—sea, lake, river and canal,—would through the machinery of that confederacy be economized and extended to its utmost possible limit. If the confederacy were touched by competition at one point, it would feel it at all points. Throughout, its rates would rise and fall together. Thus if one form of competition should cease, another would be prodigiously quickened.

But allowing even the monopoly to become complete, and having only such forms and degrees of restraint as law, usage, public sentiment and self-interest can supply, we are by no means without analogous cases having a very close bearing on the argument. In our cities, for instance, as regards the supply of gas, it is found cheaper and better for the community to have to do with one company than with several. So also as respects the supply of water. In this country it is now usual for cities and towns to construct their own waterworks. If this, however, were not the case, few would be disposed to deny that a city having to do with a single aqueduct company would be apt to have a much more satisfactory service than one which sought to divide it among many. Carrying now the argument directly into the case of railroads, and having recourse again to experience, we find that railroad competition has been tried all over the world, and that everywhere, consciously or unconsciously, but with one consent it is slowly but surely being abandoned. In its place the principle of responsible and regulated monopoly is asserting itself. The same process, varied only by the differing economical, social and political habits and modes of thought of the people, is going on in France, Belgium, in Germany and in Great Britain. The experience of the three first named countries bears much less strongly than that of England on the particular conditions existing in America, yet even for us their experience is not without its significance. In France we see six great corporations dividing the country into as many distinct territories, and each of the six directly responsible for the territory served by it; while both these corporations and the government view with undisguised apprehension the recent appearance of a competing, though subsidiary, system. In Prussia, all the railroads are rapidly passing into the hands of the state, to be operated as well as owned by it; while in Germany, as a whole, the imperial govern-

ment is preparing to exercise a direct jurisdiction over the lines within the empire, whether operated by private companies or by states or principalities. It is as if in this country the railroads within their limits belonged wholly, or in a very large degree, to the several states, and the national government were to exercise a direct control over all foreign and interstate railroad traffic. So far, therefore, as German experience is concerned, its future value to America, except in one important respect, is sufficiently apparent from a mere statement of the case. Without changes which would alter if not subvert every characteristic of our government, the German solution of the railroad problem is impossible of adoption in America. Conceding the very disputable point, that under certain circumstances the management of a business undertaking by the government, exclusively, may be productive of the best results,—even conceding this, it is still apparent to any one at all acquainted with political conditions and tendencies in this country, that such an extension of government patronage and power is wholly inconsistent with the continued permanence of our system. Wide, however, as the two roads apparently diverge, they lead to the same results:—concentration on the one hand, and responsibility on the other. Government concentration and responsibility to parliament in Germany—corporate concentration and responsibility to usage and public opinion in America. Which policy will prove to have in it the least admixture of evil? Which will produce the machine best adapted to doing the practical work of the community?—in neither will railroad competition be a principal factor.

In Belgium alone has railroad competition proved a permanent advantage; and it has proved so there for the simple reason that the competition between railroads in Belgium, unlike that in the United States, was never uncontrolled. A hand was always on the regulator. The government, as the largest owner of railroads, was itself the chief competitor, and as such its action was certain, equitable and justly distributed. It could not show preferences, or discriminate, or make good the losses sustained in fighting over a divided business out of profits extorted from an exclusive business. Regulated in this way, competition could be kept alive and made beneficial. It did not wear itself out by its own excesses.

Of all foreign experiences, however, that of England most resembles our own. The only essential difference is that England is wealthier and infinitely more compact than the United States, so

that, as respects railroads, causes produced their results much more quickly there than here. Nowhere, however, is the present tendency towards the concentration of railroad interests in a few hands more apparent than in England. The mill of competition has there about fulfilled its allotted work. The whole English railway system has now passed into the hands of a few great companies, by whom the country is practically divided into separate districts. These are literally in the hands of monopolies. The practical result of this consolidation, as compared with the old-fashioned competition, was set forth in two concrete cases by the parliamentary committee on railway amalgamation of 1872, in language which has already been quoted, but which in this connection will bear repetition.

The North-Eastern railway "is composed of thirty-seven lines, several of which formerly competed with each other. Before their amalgamation they had, generally speaking, high rates and fares, and low dividends. The system is now the most complete monopoly in the United Kingdom; from the Tyne to the Humber, with one local exception, it has the country to itself, and it has the lowest fares and the highest dividends of any large English railway. It has had little or no litigation with other companies. While complaints have been heard from Lancashire and Yorkshire, where there are so-called competing lines, no witness has appeared to complain of the North-Eastern; and the general feeling in the district it serves appears favorable to its management."*

There is scarcely a section of the United States which could not tell of an experience very like the English one just referred to. Massachusetts, for instance, could supply a well-known case in point. Of two sections of that state lying north and south of the city of Boston, the one known as the Cape Ann and the other as the Cape Cod district, the first has from the beginning been served by two rival lines whose whole history has been one long trial of strength, resulting at last in the absolute ruin of one and in the severe crippling of the other. How many millions of dollars were recklessly squandered in the long course of the struggle, it is impossible to compute. While the Cape Ann district has thus enjoyed the benefits of railroad competition, the southern or Cape Cod district has, on the other hand, been served by a single consolidated

*Report from Select Committee on Railway Companies Amalgamation (1872) page xxvii.

corporation, the cardinal principle with which has been monopoly. It appropriated to itself a certain district, and that district it undertook to furnish with all reasonable railroad facilities; but within the limits of its own territory it did not propose to tolerate any rival. The result in these two cases, whether in accordance with theory or not, is confirmatory of experience. Between its two rival corporations the northern district was through years converted into a battle-ground, and turned upside down; rates fluctuated wildly and varied everywhere; common tariffs were made and not observed, and profits were pooled; bits of connecting road were seized hold of by the one combatant or the other, and were perverted from serving the community into being engines of attack or defense. As to the two companies, with that impenetrable stupidity which usually characterizes the lover of petty independence, they sturdily preferred to lose thousands in conflict rather than incur the risk of being over-reached in negotiation by so much as a dollar. Each of them absolutely threw away enough money to buy up the other in that stupid fighting in which thick-headed presidents and "smart" superintendents uniformly delight. The one meant "to get even with the other," and both were resolved, no matter how much it cost, to have its "share of the business." Between them they ruined the business, dissatisfied every one, and then—came to terms with each other. Meanwhile, in the southeastern section of the state peace certainly prevailed, if not absolute contentment. As respects railroads this last it is not well to expect, and, if expected, it will not be found. Nevertheless it is certainly true that, according to general experience, the nearest approach to it is reached, not only abroad but here, through the course pursued in this case. The reliance on competition seems to give throughout a false direction to public opinion as respects railroads. They are looked upon as something alien, if not hostile. The public welfare is associated in the popular mind with their misfortunes. On the other hand the intelligent and peaceful operation of a consolidated company is generally followed by a sense of responsibility on the one side, and of ultimate friendliness on the other.

Besides the economical arguments which are so difficult to be overcome in this discussion, there are certain other objections to any such solution of the railroad problem as that suggested, which cannot be ignored. They have at least a strong hold on the popular ear and mind. In their character they are political or senti-

mental. As respects those of the first description, it is certainly not too much to say that jealousy of great corporations is a cardinal article in American political faith. There is reason for it, too; and in this respect recent scandals have given to railroad corporations a peculiar and unpleasant prominence. Neither is this instinctive jealousy confined to America. It is only a very few years since the present Sir Henry Tyler, in one of the reports of the Board of Trade of Great Britain, formulated the proposition that the time was at hand when "the state must control the railroads or else the railroads would control the state." Yet when the parliamentary committee on amalgamation considered this question in 1872, they were obliged to report that the "growth of the corporations had not brought with it the evils generally anticipated." The fact is that in this, as in so many other instances, the truth of Mr. Disraeli's aphorism, that "in politics it is the unexpected which is apt to occur," received fresh illustration. In this country, as well as in Great Britain, those wise people who so earnestly point out the dangers incident to railroad concentration wholly ignore the important practical fact that concentration not only brings with it a corresponding increase of jealousy, but also an equally increased sense of responsibility. It is not the few great corporations which are politically dangerous, but the many log-rolling little ones. No one who has had experience in dealing before a legislative body with questions affecting railroad interests has failed to realize this fact. The burden of responsibility—almost of popular odium—which the large corporation bears, the ease with which a senseless cry can be raised against it, is even, as compared with smaller corporations, out of all proportion to its increased strength. So much has been written and declaimed on this subject, however, that it is well to be as distinct as possible in dealing with it. The popular apprehension of imaginary dangers to be apprehended from railroad consolidation is not well considered. With those who have most reflected on the subject it is safe to say that the idea of a combination of all the railroad interests of the country into the hands of three or four corporations,—even though they might practically be the creatures of a triumvirate's will,—would excite no apprehension. That corporation, or those who composed that triumvirate, would retain power only by most carefully abstaining from all abuse of power. Little as those who expatiate on the subject seem to realize it, it is nevertheless true that with each new

railroad the Vanderbilt or the Jay Gould or the Huntingdon interest acquires, the more cautious and conservative they become. They realize the responsibilities and dangers of their position, if their critics do not. The only present difficulty is that those who undertake to represent the community neither understand the situation, nor know how to take advantage of it.

Finally it remains to consider the sentimental objections. The combination of railroads, it is claimed, is unrepblican,—through it the dynasty of the "Railroad Kings" is insidiously asserting itself. This argument is of the kind which sets refutation at defiance. Not infrequently it is met with in the columns of the press, but it is an argument appropriately addressed only to that discouragingly large class among whom words are money and not counters. It is unmitigated cant, and deserves only to be treated as such. There is a principle much nearer the foundation of republican institutions than any jealousy or apprehension of Railroad Kings—the great principle of not unnecessarily meddling. After all, men and systems can best develop themselves in their own way, and it is hardly worth while either to continually prognosticate evil, or to pass one's life in fighting shadows.

Briefly reviewing the whole ground which has now been traversed, it is obvious that the tendency of events and drift of discussion are everywhere the same—away from a reliance on the beneficial effect to be derived from the uncontrolled competition between railroads. In America only does any considerable body of reflecting persons continue to have faith in it. In France and in Belgium the principle never was recognized, and the later tendency is distinct and strong against its admission. In Great Britain, where it originated, it is now definitely abandoned. It has been abandoned in Germany also, and the experiment of exclusive state ownership and management is to be substituted for it. Thus the tendency of events is all in one direction. It varies simply in degree, and as it is affected by the political habits and modes of thought of the nationalities. In one country the direct principle of exclusive state ownership is accepted, while in another a system of close public supervision is assuming shape. Thus supervision, always increasing in efficacy, would seem to be the practical Anglo-Saxon solution of the problem, while, upon the continent of Europe, that solution is abandoned in favor of a purely governmental system. The paths diverge, but the end is the same—restraint of an excessive compe-

tion resulting in a perpetual chaos. Order is evolved in different ways, but it is evolved at last.

Owing to the extremely complicated character of the American railroad system, rendering anything like a territorial division among corporations impossible, results here work their way out slowly. When they do work their way out, however, it is apt to be on a large scale and in a way not easily susceptible of change. So far as any progress has yet been made, it is obviously in the direction indicated,—the development of government supervision on the one side, and the concentration of railroads to escape competition on the other. The manner, indeed, in which, starting from different stand-points of interest and opposite sections of the country, the Massachusetts Commission and the Southern Railroad and Steamship Association have unconsciously worked towards a common ground, is noticeable. On the one hand the whole effort of the Commission has been to develop a tribunal which, in all questions affecting the relations of the railroad system to the community, should secure publicity and that correct understanding of the principles upon which only legislation of any permanent value can be based, and which is reached through intelligent public investigation. That secured, all else might safely be left to take its own course. A sufficient responsibility would be secured to afford a guarantee against abuse. On the other hand the fundamental idea of the association, without the realization of which it remains incomplete, is to so confederate the railroad system that the members of it should be amenable to control and that responsibility should attach to it. Could the two results be brought about, the machinery would be complete. The confederated railroad system would confront the government tribunal, and be directly responsible to public opinion. This is almost precisely the result arrived at in France and in Great Britain.

It would be altogether premature to predict with any confidence that this or a similar result will speedily be reached in this country. Judging by experience, it is more probable that the development on the side of the railroad system will far outstrip that on the side of the government. The popular disbelief in the possibility of any permanent combination of the railroads, at once general and effective, is so complete that no provision will be made for it. Should one be brought about it will, however, in all probability, once it assumes shape, assume it very rapidly. In that case no great degree of public injury would necessarily be sustained, but the difficulty

of thereafter restoring the necessary equilibrium would be materially increased. Another and more persistent political movement of the Granger character might and probably would become a necessity. As opposed, however, to an overshadowing commercial interest, so concentrated that all eyes and passions could be brought to bear upon it, this is not likely to be a movement difficult to originate or easy to resist.

COMPETITION AND COMBINATION IN PRACTICE *

BY ARTHUR TWINING HADLEY.

The principles dealt with in the last chapter (Competition and Combination in Theory) have been developed at some length, because they are necessary to any true understanding of recent railroad history, or to any intelligent judgment on matters of railroad legislation.

It is only in the last few years that they have become thus important. The earlier railroad combinations could be easily understood without them. These earlier combinations were for the most part mere consolidations of different links into one connecting line. Take, for instance, the growth of the Vanderbilt system. In 1853 the New York Central was formed by the consolidation of what had been originally eleven railroads: Albany and Schenectady, Schenectady and Troy, Utica and Schenectady, Syracuse and Utica, Auburn and Syracuse, Auburn and Rochester, Rochester and Syracuse direct, Rochester, Lockport, and Niagara Falls, Buffalo and Lockport, Tonawanda, Attica and Buffalo. From 1855 to 1858, the system thus formed gained control of five more roads: Rochester and Lake Ontario, Buffalo and Niagara Falls, Lewiston, Athens Branch, Niagara Bridge and Canadaigua. Then came Vanderbilt's achievements: the union with the Hudson River Railroad and the Harlem on the east; and (in some sense) with the Lake Shore and Michigan Southern, the Canada Southern, the Michigan Central, the New York, Chicago and St. Louis, on the west; the whole system including more than four thousand miles of line.

This is simply one instance among many. If we trace back the history of almost any of our large railroads we find that they were formed by the consolidation of many smaller ones. Such a course of events was a necessity. As long as railroads were purely local affairs, each locality might charter and run its own. The moment any large through traffic grew up, this was found to be a wasteful way of doing business. If they changed cars at every point of junction, the expenses were vastly increased. If they did not change

*Being Chapter V of President Hadley's classic work on "Railroad Transportation," Putnams, 1885.

cars, there was still the awkwardness of dividing responsibility, and the evil of having two separate organizations where one would do the work better. It required no special training to see the necessity of such consolidation, and no extraordinary business talent to carry it through.

But there was a point beyond which these matters did not take care of themselves, and could only be managed by great leaders. The trunk lines of the country reached this point about twenty years ago. At that time the main routes were pretty well consolidated as far as the Ohio River or the eastern end of Lake Erie; for their through connections to Chicago or St. Louis, they made use of independent roads. The men who did most to change this state of things were Cornelius Vanderbilt and Thomas Alexander Scott. Scott began earlier and went farther; but there was a dashing quality about Vanderbilt's doings which make him the central figure in this movement.

Scott entered the service of the Pennsylvania Railroad in 1850. He was rapidly promoted and soon made his influence felt in the policy of the road. In 1860 he became Vice-President chiefly through the exertions of J. Edgar Thomson, who gave him active support in all his projects. They had already secured possession of the Philadelphia and Erie, and were busy with other schemes of the same sort, when the war interrupted all these plans. At the close of the war they were pushed on with renewed activity; the system was extended westward to Chicago, St. Louis, and Cincinnati, southward to Baltimore, eastward all over New Jersey, and northward as far as Lake Ontario. Scott himself went far beyond these limits, and was personally brought into financial trouble in 1873 in connection with the Texas Pacific. These things did not, however, involve the company, nor did they interfere with his position at its head. On the death of Thomson in 1874, Scott was elected president and held this position till 1880, a year before his death. As a result of his policy, the Pennsylvania Railroad and its *alter ego*, the Pennsylvania Company, together control nearly seven thousand miles of the most valuable railroad property in the United States.

Vanderbilt was thirty years older than Scott, but he did not go into railroad business until several years later than his rival. Through his early life he had been a steamboat captain, and in the years 1850-1860 he was one of the foremost steamboat owners in the world.

But his business sagacity led him to foresee the future of the railroad system; and about the beginning of the war he gradually withdrew from the sea, to invest his capital on land. In 1863 he began buying Harlem as an investment. He bought some of it at .03; thanks to the operations of those who tried to break him down by selling it short, he carried it up to 285. He went into Hudson River in 1864; in 1867, after some opposition, he secured control of the New York Central, and consolidated it with the Hudson River Railroad in 1869. In a desperate attempt to gain control of Erie he was foiled; but he and his friends were more successful in their efforts farther west, on the Lake Shore and the Canadian roads. There were thus finally united under one general management (though not under one concern as in the Pennsylvania system) some four thousand miles of railroad between New York and Chicago.

Parallel to these, but more slowly, were developed three other trunk-line systems—the Grand Trunk on the north, the Erie in the middle, and the Baltimore and Ohio on the south. The early development of these systems had been to a certain extent retarded—in the case of the Grand Trunk by disadvantages of situation, in the case of the Erie by speculative management, in the case of the Baltimore and Ohio by the war. But though not equal in strength to the systems first named, each of these controls from two thousand to three thousand miles of line between the seaboard and the Mississippi valley. The tendency toward consolidation on parallel lines is the distinctive feature of railroad geography in this part of the country. The West Shore, the Lackawanna, the Chesapeake and Ohio, are instances of this which have come up within the last few years. Certain systems between the Lakes and the Ohio River, like the Cleveland, Columbus, Cincinnati, and Indianapolis, resist the tendency, but find it hard work to do so. West of Chicago and St. Louis the rival lines do not run parallel, but radiate from common centers. They reach out in all directions to collect grain for the great western markets. From Chicago we have, beginning on the north, first the St. Paul, and then the Northwestern system, each with about five thousand miles of line, then the Rock Island with fifteen hundred; the Chicago, Burlington and Quincy with four thousand, the Chicago and Alton with about one thousand, and the Illinois Central with two thousand. These systems have grown and consolidated even more rapidly than the trunk lines. From St. Louis

we have the same sort of radiation, only here one company, the Missouri Pacific, has become overwhelmingly strong, and controls six thousand miles, or, with the closely allied Wabash system, ninety-five hundred miles. Farther to the west, beyond the Missouri River, parallel lines of trans-continental traffic again take the place of radiating ones. It is, however, too soon to tell what shape these systems in the extreme West will finally take, and whether we may not have a gigantic general consolidation of all lines.

In the states south of the Potomac and east of the Ohio, the western form of railroad geography is reversed. Instead of railroads radiating from the central markets toward the points of production, the points of production are in the center and the markets lie all around the edge of the district—on the seaboard, the Gulf, the Mississippi, or the Ohio. There is an inward radiation instead of an outward one.* In the northeastern states consolidation has not taken place on nearly so large a scale as in other parts of the country, and especially not on as long lines. There has been consolidation by districts, rather than consolidation into extended systems.

The efforts to secure unity of management in certain details went far beyond the limits of actual consolidation. This unity was most necessary in the handling of through passengers and freight. To tranship frequently, involved great trouble and expense. On the other hand, for a road to let its own cars pass on to other lines without any one to look after them, involved the danger of serious loss. The first solution tried on a large scale was to accommodate the through traffic by special cars, owned and looked after by a company which was, at least nominally, quite distinct from any of the railroads over which the cars were run. Thus there grew up sleeping car companies, express companies, or freight-transportation companies.

In the passenger and express business, the system has continued till the present day. The express company owns the cars and assumes the responsibility to the public; it runs its cars under a contract with each railroad.† The sleeping car arrangements have the

*The strongest individual system in this district is the Louisville and Nashville, which with its affiliated lines includes over three thousand miles of road.

†These contracts take the most varied forms. U. S. Census, 1880, Vol. iv, pp. 594-612 (bottom figures).

same general form; on their face they are usually more unfavorable to the railroad. But the through-freight business has gradually taken a different shape. The earliest form of fast-freight line was organized like an express company—it owned the cars, assumed the responsibility, collected all it could from the public, and paid the railroads a carload rate very much smaller than what it charged the public. Some of these lines still exist—the Merchants Despatch Transportation Company is an important instance. But it was found that these lines afforded great opportunities for corruption. The directors of railroads would buy stock in the transportation company, and then give this company a contract which enriched it (and them) at the expense of the stockholders whose interests were entrusted to their charge. An effort was made to avoid these abuses, by paying the freight charges to the railroads, and giving the transportation company a certain percentage as its commission. This was only partially successful.*

A much more useful device was the co-operative fast-freight line,† which avoids the abuses of the old system, and now prevails all but universally. It avoids all stealing, because there is nothing to steal. A co-operative freight line has very few expenses, and no earnings at all. It is nothing more than a system of looking after cars and keeping accounts. The principle is this: Each road connected with the line sets apart a certain number of cars for line freight. It marks them with some distinguishing color or mark, but continues to own them. Each road lets the line cars of other roads pass freely over its own track without transshipment. It collects the transportation charges on its own part of the route, no matter whose the cars may be. It reports the movements of the cars to the central office of the line. In the accounts of this office, a certain sum ‡ (say $\frac{3}{4}$ cents per mile run) is charged against the road for the use of the cars of other roads on every mile that its cars have been used on other roads. The fast freight line thus acts as a car-clearing house to settle debits and credits for the use of cars of other roads.** It cannot be made a means of fraud, any

*Hepburn Committee Report, p. 9, testimony (Blanchard), pp. 2959-62.

†Hepburn Committee Report, p. 8, testimony, p. 2963, ff. Testimony before U. S. Senate Com. on Transp. Routes to the Seaboard, 43d Congress, 1 Sess., 307, part 2, pp. 360-65. J. D. Hayes in U. S. Internal Commerce Report, 1876-77, Appendix, pp. 49-60.

‡Varying according to the condition of the track—largest in the South, smallest on the trunk lines.

**The New England Car Clearing-House in Boston does the same sort of work under more complicated conditions.

more than a clearing-house can be made a means of fraud. It has no receipts of its own. The sum of the debit balances for one set of roads must equal the sum of the credit balances for the rest, leaving the line itself neither the gainer nor the loser. Only in case of loss or damage does the freight line receive money not due to some other road or roads; and the money thus received is, of course, paid out to the shipper. The only real payments to the line as such, are paid to be spent for salaries and office expenses. As for the line itself, it is neither a corporation nor a partnership. It is simply a set of arrangements for carrying out certain contracts between several railroads. The very agents of the line, in their dealings with the public, are responsible only for some specific road or roads, and not for the line as such.

This total absence of all possibility of cheating caused the co-operative freight line to grow rapidly in favor. The Erie road reduced the expense of looking after through freight from about nine per cent of the earnings on such freight (its previous figures) to three per cent. This was done by simply changing from the old form of freight line to the co-operative form.*

This is the great advantage of the co-operative freight line system. It also has the advantage that it causes the rolling stock to be rapidly utilized. The disadvantages of the system lie in the lack of responsibility, due to the extremely loose character of the agreements under which the freight line is managed. The absence of any power which can steal involves the absence of any power which can be held responsible for damages or abuses. The shippers feel this evil quite constantly.† The railroads themselves feel it occasionally. The through freight of a railroad may be dependent upon the discretion of the soliciting agents of a fast-freight line,—agents living perhaps a thousand miles away. These agents are responsible to no authority except that of their own roads. Yet on their uncontrolled discretion—or indiscretion—the policy and the prosperity of distant lines may become absolutely dependent. This is strongly felt in the case of great railroad wars; it is perhaps the most fruitful cause of such wars.‡

*Blanchard: Test. before Sen. Com. on Transp. Routes (1873), p. 364.

†Proceedings of the New York Board of Trade and Transportation, 1884, pp. 32-42.

‡For the effect of irresponsible freight agents in causing railroad wars, see Hepburn Com. Testimony, pp. 520, 522 (Fink), 3007 ff. (Blanchard).

Thus the very means which bound connecting roads more closely together only caused a sharper rivalry between different systems which were not thus bound. Railroad wars became more and more severe. As long as the competitive strife was merely local, it was of but trifling importance. When it extended over thousands of miles and involved millions of tons of freight movement—not to say millions of dollars' loss to stockholders—it became a matter of national concern. Such wars could only end in consolidation or pooling; and as the railroad systems themselves became larger, public interest in railroad pools rapidly increased.

The earliest railroad pools were probably developed in New England, but they were on a small scale, and the whole thing was often so quietly done that their very existence was almost unsuspected. The first railroad pool which has had an important public history was the Chicago-Omaha pool, established in 1870.* Chicago and Omaha were connected by three roads, almost exactly equal in length, and not far different from one another in financial resources. Their through business was so important that they could not afford to reduce rates to a cut-throat point. An equal division was so obviously fair that it was maintained for many years without much bickering. As long as the original conditions remained the same, there was little trouble. The pool went through the Granger movement unshaken. It was subsequently joined by other roads. Its original form was broken up in 1884, because the system which composed it had outgrown the limits to which the old framework could be stretched. But the principle was by no means abandoned. Each year had seen it more and more widely extended. A Southwestern Association, dealing with the traffic of St. Louis as well as of Chicago, was established in 1876, and had an important though somewhat checkered career.** Pools were established from Chicago to the Ohio River on the southeast, and to Minnesota on the northwest, while beyond the Missouri they were extended to include the traffic of Colorado and other southwestern points, and finally the trans-continental traffic as far as the Pacific coast itself.

Not quite so extensive, but far more completely developed, were the pooling arrangements in the country south of the Potomac and the Ohio.† The competition in certain districts of the South had

*U. S. Internal Commerce Report, 1879, pp. 175 ff.

**Intern. Com. Rep., 1879, p. 174; Appendix, pp. 51, 52.

†Fink, in U. S. Internal Commerce Report, 1876, Appendix, pp. 12-24.

been even more reckless and ruinous than elsewhere. A few railroads in Georgia attempted (1873) to avoid these evils by combination. Out of this attempt grew the Southern Railway and Steamship Association. It was well managed from the first, and within three years from its organization it had come to include nearly the whole railroad system of the South and a large number of connecting or competing steamship lines. It was nominally a "net money pool," that is to say, any road carrying more than its share of the through traffic paid its rivals the excess receipts, less a certain allowance for expenses of carrying; but this allowance for expenses was purposely made too small, in order to take away from the roads all inducements to run ahead of their percentages. But the Southern Association was something more than a mere system of pooling contracts. Its object was not simply to settle what shares of competitive traffic each line should carry, but also to facilitate the handling of through traffic. This it did by establishing bases of classification, rates, etc.; but above all by the establishment (1875) of a clearing house to settle the through-traffic accounts. All these things were done after discussion by an advisory board consisting of one delegate from each railroad; but the executive officer was not bound by the opinion of the majority. The man who organized the association, and acted as its executive officer until called to a wider field of activity was Albert Fink.

The necessity for trunk-line pools did not arise until the heavy trunk-line traffic was developed. For a long time this was relatively unimportant, because so much was carried by water. The Lakes, the Erie Canal, and the Hudson River formed an unrivalled line of transportation to the east. The Mississippi River on the south was almost equally efficient. When it cost the railroads two cents a mile to transport a ton of freight, the long-distance freight went by water as a matter of course. Only on the higher class of goods, where speed was quite as important as economy, could the railroads compete with decided advantage when the canals were open.

But a series of changes* made it possible for the railroads to compete for this through traffic; and the moment they undertook to do so they found it a prize worth fighting for. These wars on a large scale began in 1869, when the New York Central and the Pennsylvania each had obtained virtual control of its Chicago con-

*See chap. vi.

nection.* In 1868 rates from Chicago to New York stood at \$1.88 per 100 pounds for first-class goods, and \$0.82 for fourth-class. In the summer of 1869 they fell, under the stress of competition, to a common rate of \$0.25 per 100 pounds on all classes. With railroad methods as they existed at the time, such a reduction could not be maintained, and in the following years (1870-74) they were at least nominally kept at figures of \$1.00—\$1.50 for first-class, and \$0.60-\$0.80 for fourth. But in the year 1874 a new element of disturbance appeared.** The Baltimore and Ohio secured its Chicago connection, and almost immediately afterward the Grand Trunk began operations as a competitor on a line connecting Milwaukee and Detroit with the northern Atlantic ports. The efforts of the New York Central and Pennsylvania systems to maintain rates were rendered of no effect by the recklessness of the Grand Trunk and the offishness of the Baltimore and Ohio; while the bankrupt condition of the Erie made it almost impossible for it to pursue a conservative policy in these matters. The year 1875 was passed in feverish excitement; 1876 saw the beginning of a wild railroad war. First-class rates were quoted at 25 cents per hundred, fourth-class at 16 cents; actual rates went much lower.

It is needless to say that railroad profits fell rapidly. But the effects went far outside the circle of railroad stockholders. The canal lost business, and the reduction of tolls which was hurriedly made could not prevent this loss.† The canal was no longer the dominant power which it had once been. And this loss of importance of the canal was a relative loss of importance to New York City. As long as the canal was distinctly the best route, the port of New York had a kind of monopoly; and the owners of the various monopoly rights used them remorselessly. High charges were imposed, vexatious and uneconomical ways of doing business were enforced. When Baltimore, Philadelphia, and Boston became competitors, traffic at those points was burdened with no such restrictions.‡ Every facility was afforded for handling the through trade cheaply. Under these circumstances their commerce grew rapidly, while that of

*"Statistics Concerning the Movement of East-bound and West-bound Traffic over the Trunk lines and Connecting Roads." New York, 1884.

**Adams, "Railroads," pp. 154 ff.

†Compare Fink: Rep. on Adjustment of R. R. Transportation Rates (N. Y., 1882), p. 40.

‡Hepburn Com. Rep., pp. 22-26. Compare W. N. Black: "Storage and Transportation in the Port of New York," 1884.

New York did not. To the fight between railroads was thus added a fight between cities, which gave new intensity to the contest.

The fight ended in 1877, not because anything was settled, but because all parties were exhausted. As between the different cities it resulted in a compromise. Philadelphia was given a small advantage over New York in the matter of rates from the West, Baltimore a still smaller advantage over Philadelphia. That any difference at all should be allowed was a concession on the part of the New York roads; but the differences were much less than those for which Baltimore and Philadelphia had been contending.

On the part of the railroads the results were more definite. They not only stopped fighting, but they made arrangements to prevent such fighting in future by pools. Trunk-line pools had not been quite unknown;* but they had generally been managed by outside parties** (eveners), in such a way as to intensify the abuses to which the system was liable. Now the roads took the matter in hand themselves. The division of west-bound traffic was arranged in 1877. The east-bound pooling arrangements were more complicated, owing to the number of initial points of shipment; and it was two years before they could arrange any division at all. Meantime, an association, something like that of the southern roads, had been formed by the trunk lines and their connections, under the title of the Joint Executive Committee. Albert Fink was at its head. It never attained the thoroughness of organization which there has been in the South. There was no clearing-house system, and no means of forming pooling contracts by any central authority—only by the voluntary action of the roads in each individual case.† We thus had three distinct sets of arrangements. 1. As to differentials between cities. 2. As to percentages of traffic between trunk lines. 3. As to general business arrangements, rates, etc., under the Joint Executive Committee.

*The Anthracite Coal Combination was the earliest instance. It was undertaken by the roads as mine-owners rather than as carriers. It was strongest in the years 1872-76. It aimed to limit production, not merely to divide it. The combination owned about 75 per cent of the anthracite coal fields. Its measures against independent mine-owners were extremely oppressive. For dates, etc., see *Int. Com. Rep.*, 1879, pp. 179-182.

**Hepburn *Com. Test.* (Blanchard), pp. 3315 ff. *Int. Com. Rep.*, 1879, p. 177. The Standard Oil Co. was the worst instance. The system of cattle eveners was as bad in principle, but was never carried out with the same power.

†Hepburn *Com. Testimony*, pp. 3120 ff. (Blanchard). Fink: "The Railroad Problem and its Solution," 1880.

One result of this settlement was an increase of traffic by water. The business of the Mississippi River, stimulated as it was by the construction of the jetties at its mouth, grew enormously.* Even the traffic of the Erie Canal revived for the time being. The advantage during these years was in favor of New York as compared with Baltimore, or as compared with any other port except New Orleans. But the people of New York were not satisfied. They were displeased at what seemed to increase the arbitrary power of the railroads; and the result of their dissatisfaction was the appointment of a Committee of the New York Assembly—commonly known as the Hepburn Committee—"to investigate alleged abuses in railroad management." They brought to light abuses enough; but the general drift of the evidence showed unmistakably that the pooling system, under the administration of Mr. Fink, had lessened rather than increased those abuses.**

Still the New York merchants believed that the existing arrangements as to differential rates did not do them justice; and the railroads leading to New York appear to have shared this belief. At any rate, the agreement was terminated in the year 1881, by action of the New York Central;† and a fierce railroad war raged for eight months afterward. It did not involve as great a reduction of dividends as has sometimes been the case, because general business was prosperous and prices were high; but the reduction in rates was very great. The railroad organization was quite powerless to stop this fight. An effort was made to have recourse to arbitration, and Messrs. Thurman, Washburne and Cooley were appointed an advisory committee on the subject. Their report was interesting, but it settled nothing. They showed clearly enough how Baltimore claimed that rates ought to be based on distance, while New York based her claims for equality on the advantage of the New York Central in matter of grades. The committee showed the fallacy of some of these points, but they could not show any principle on which the matter should be decided.‡ Mean-

*Internal Commerce Report, 1881, pp. 48 ff. The exports of grain and flour at New Orleans increased from less than one million bushels in 1875 to over twelve million in 1880.

**This is candidly admitted by Simon Sterne himself, although he was professionally employed by the complainants before the Committee.

†Fink: "Report on Adjustment of R. R. Transportation Rates," 1882, pp. 6, 7.

‡Report of Messrs. Thurman, Washburne and Cooley, an Advisory Commission on Differential Rates, etc., N. Y., 1882.

time Mr. Fink had been studying the subject, with more definite results. If he did not solve the question, he at any rate did a great deal toward clearing it up.* He showed that the violence of the competition between the seaboard cities was due to the fact that they were simply intermediate points on the roads between Chicago and Liverpool, or some other European port. Of this whole route the railroad formed one part, the water route across the Atlantic the other. He further showed how ocean rates adapted themselves to rail rates, so that the rate Chicago-New York *plus* New York-Liverpool was almost exactly equal to the rate Chicago-Baltimore *plus* Baltimore-Liverpool.** This being the case, the amount of traffic at each port was regulated by the harbor and warehouse facilities in each case; and as long as the differentials were not grossly unfair, matters would adjust themselves.†

Matters finally settled back on the same general arrangement as before. But one thing became clear. The water routes could not compete with the railroads at the railroads' war rates. The railroad war of 1881-2 had checked the development of Mississippi River traffic, and had rapidly cut into that of the Erie Canal. The complete abolition of tolls on the latter was almost a matter of necessity; and when it came, it did not suffice to protect the canal business in the face of a renewed railroad war.

For the peace of 1882 was of shorter duration than its predecessor; and the war which began in 1884 was, in many respects, a more serious one. It was no longer a conflict between cities, but between railroads—and an aggravated one at that, because some of the roads had been built for speculative purposes. In some respects it was a repetition of the events of ten years before; only now the West Shore, the Lackawanna, and the Chesapeake and

*The "Report on the Adjustment of Transportation Rates to the Seaboard," already cited, is one of the most successful applications ever made of mathematical methods to social phenomena. It ought to give Mr. Fink as high a rank among scientific investigators, as he holds among practical men. Unfortunately, it is so abstruse that very few people take the time to do it justice.

**If the goods transported by the Central or Erie alone were considered, New York suffers a very slight disadvantage as compared with Baltimore. But if we take into account the canal rates, New York has a slight advantage.

†The legitimate inference from Fink's arguments is, that the differential rate ought exactly to counterbalance the difference in cost of ocean carriage, if things are to be adjusted on a theoretically correct basis; but that, practically, things will quickly adjust themselves to any basis whatever.

Ohio had taken the place occupied ten years before by the Grand Trunk, the Erie, and the Baltimore and Ohio. It is too early (July 1, 1885) to predict the outcome of the existing war. But it is a mere truism to say that it must end in combination in some form. It is all very well to talk of free competition and survival of the fittest. But permanent competition is virtually out of the question. And survival of the fittest is only possible when the unfittest can be physically removed—a thing which is impossible in the case of an unfit trunk line. The lion and the lamb must lie down together. The only questions are, first, how long before this state of things is to come about; and, second, whether the lion is to lie down outside of the lamb.*

*As we go to press these questions seem to be rapidly settling themselves.

HOW TRAFFIC ASSOCIATIONS ARE ORGANIZED

BY F. A. LELAND

Chairman of the Southwestern Tariff Committee.

An organization of this nature, under different names, has been in existence among the Southwestern lines, dealing with rates to and from the State of Texas, for about twenty years. Its principal function at the present time is to compile and print for account of members and the other participating lines what are known as common tariffs, embodying rates for account of all such lines in the common territory. This results in tariffs which are more uniform in application and more intelligently represent the views of the Interstate Commerce Commission as expressed in their Tariff Circular No. 17-A, while reducing to a very great extent the expense which carriers would be put to were such rates published by each separately.

Our Special Circular No. 3-A gives an outline of the tariffs which we publish. The tariffs contain from 20 to 500 pages each, and apply between practically all of the territory in the United States and the States of Oklahoma, Arkansas, Louisiana, Texas, and the Republic of Mexico. This method of tariff publication has been greatly encouraged by the Interstate Commerce Commission for the purposes mentioned above, and it represents the greatest development along these lines of any similar organization in the United States. In other words, while our membership and territory may not be as extensive, the number of publications issued by this office is far greater than by any other of the tariff agencies.

The other important function of the committee is that of affording to the railroad companies facilities for the expeditious handling of the suggestions for rate changes which are constantly being received by the carriers from the interested shipping public. The carriers believe that only by a free interchange of views among themselves and the interested shippers can these suggestions as to rate changes be made in a manner at all satisfactory to either the carriers or to the shipping communities. In other words, the shipper applies to one or more railroad companies for a better adjustment of freight rates on his traffic for the purpose of enabling him to

increase his trade at certain markets, which he fears he will be deprived of by some other shipper at some other shipping point which, in his opinion, has a better relative freight adjustment. There are very few cases where the shipper contends that the rate, *per se*, is unreasonable. Manifestly, requests of this kind could not be accepted by the interested carrier without some discussion with the other lines serving the shippers from the other points of origin and other shippers interested in the same commodities. This could be done by correspondence or by conferences direct with such parties, but the number of such requests is so great that it is systematized by the use of this organization and the holding of meetings at stated periods at which these subjects are discussed between the railway representatives, and at which shippers are given an opportunity to be heard. We then keep a record of conclusions that were reached and proceed, to a very large extent, with the publication of such changes, for account of all the lines, as may have been decided upon as a result of the discussion.

There is no attempt in this organization to restrict the freedom of the members in placing in effect from time to time any rates which they decide it is to their interest to make, and every carrier, member of the organization, has the undisputed right to instruct the chairman, as its agent, to publish any rates which it cares to adopt. The members obligate themselves, however, before making such change to outline the reasons for the change desired and discuss its effect on other markets, other commodities, and shippers with the other lines that may be affected by such change.

Another important function of the organization is the distribution from this central office to interested shippers of the tariffs issued by the committee. This is accomplished by members furnishing us the names of the shippers they desire to supply with one or more of our issues, and the prompt mailing thereafter to such shippers of the tariffs, supplements or reissues as they are published. This eliminates the delay which would be incident to the furnishing of such tariffs to the interested carriers and the redistribution from their offices to the shippers, and also avoids duplication, as we do not send tariffs if the shipper is already on our mailing list for the issue.

We occupy about 12,000 square feet of floor space in the Century Building, St. Louis, and employ an average of about seventy persons.

OBSERVATIONS OF AN OPERATING OFFICER*

BY ELISHA LEA

Assistant General Manager Pennsylvania R. R. Co.

Governor Miller, Mr. President, Members of the Faculty and the Student Body of Delaware College:

When asked a few days ago for the title of my talk before you, I was more or less at a loss to name it, as at that time it did not exist. So I selected the subject "Some Observations of a Railroad Operating Officer;" one that would be broad enough to cover almost anything I might say.

When your President did me the honor of asking me to address you, he left the selection of the subject to me. This left me in a quandary, and when a few days afterwards I ran across a friend of mine who is connected with a college, I told him my troubles; he suggested that I tell you what an operating officer does from day to day.

This is rather a difficult thing to do, but possibly you will be interested in a few observations that have occurred to me. In giving you some of my experiences on the railroad, I must apologize for the rather free use of the personal pronoun.

In May, 1893, soon after I started work with the Pennsylvania Railroad in the office of the Division Engineer at Tyrone, Pa., we had quite a serious wreck of a circus train. All the cars went off the track except the four rear ones containing passengers. Those derailed went over a small bank and were almost completely demolished.

I was on the wreck train which reached the scene of the accident a little after daylight. About a half mile before we got to the wreck I happened to look up on a hill at one side of the track, and there I saw the head and shoulders of a large lion looking out over a log. It was a sight to make the cold chills run up and down your back. We did not know then that he was chained there and had about five of his keepers with him.

*Address before the faculty and students of Delaware College.

At the place where the wreck occurred, broken circus wagons and cages were scattered all over the field. Some horses and a number of animals were loose, but the wilder and more dangerous ones had been corraled in temporary pens made by their attendants. One tiger managed to get into a neighboring farmyard, where it attacked a cow being milked by the farmer's daughter. The girl escaped injury, but the tiger killed the cow. The circus lost 51 horses, and the job of horse undertaker fell to my lot. It was no pleasant task, but it was an experience.

One of the rodmen acted as chief of the commissary, as we had to take care of the circus for about ten days until it could get on its feet again. I shall never forget one morning when the head animal keeper came to us and announced that he needed four tons of elephant food. We were stumped for a while until he said that all he wanted was hay.

There is no business in the world in which a man is judged more on the results he achieves than in the railroad business. When you report to your superior on any job, he is interested solely in knowing whether or not you have turned the trick. It is a case of you did or you didn't, not why you did or why you didn't.

Once when we were preparing plans for remodeling a station on the Tyrone Division, the Division Engineer sketched a suggestion and asked me what I thought of it. I said, "I will put it on if you say so." He replied, "I know very well you will put it on if I say so, but I want to know what you think of it." I then said, "I don't think much of it," and he answered, "I don't either."

Here is one thing that to my mind is one of the most valuable principles of proper organization: When asked your opinion by a superior officer, give him the best you have, whether it agrees with his ideas or not. After he has made a decision, carry out his ideas to the utmost of your ability, whether you agree with them or not.

We had an old supervisor on one of our branches who was very capable, but at times quite crusty. His assistants were usually young men who had just started to work on the railroad, and he sometimes lost patience with them. One youngster came to him the first day he reported for work and said: "Mr. ———, I have been sent here as your assistant. I know very little about the work, but I want to do my part and learn as much as possible." The

old man was very much pleased with his attitude and grew fond of him. Later another young man reported and said: "Mr. ——— I have not done any work like this before, but I want to do everything you tell me to do." The old man replied: "The world is full of blamed fools who do what they are told. What we want is men who will do things without being told."

The first of these young men has been promoted right along and now holds a responsible position; the second one was promoted for a while and there he stopped. He did not have breadth of vision, imagination or initiative.

I remember the case of a young man—a rodman—who worked under me in Buffalo. We had a rush job that had to be completed quickly before we were deluged with snow and ice. It was in November and we expected a storm at almost any time, as snow comes early in that locality. We had figured on a minimum of two weeks for the job. The young man had drawn up the plans and arranged all the details himself, and he had his whole heart in the work. It was Sunday afternoon when we got word to start the work the next day. At 6:30 on a cold November morning, he was on the job ahead of the other 400 men, and he stayed until the last man left. He was always the first on the job and the last to leave. Suffice it to say that he completed his job in ten days. Since then he has been promoted right along and has a bright future before him.

One winter we had quite a bad snowstorm, and on the first day of it, as no serious trouble developed up to ten o'clock at night, the Division Engineer went home and left a rodman in charge. In the middle of the night the storm grew worse and telegraph wires went down for a considerable distance between the division headquarters and an outlying supervisor's headquarters. It was up to the young rodman in the office—he had been with the road less than two years—to get word to the supervisor, and the only way he could do it was to get an engine and crew and send the message by special train, as no regular trains were running on that division at night. This was a pretty large order for a rodman, but as he could see no other way of getting the message to the supervisor, he told the train dispatcher to get out an engine and send word to the supervisor to take his work train out and clear up the trouble. The rodman did not know whether he was doing

right or not, but he did know he had to do something. He might have made a mistake, but it would have been better than doing nothing at all. The man who has never made a mistake has probably never trusted his own judgment to any great extent. On a railroad, and generally in other lines of endeavor, sins of commission are more easily overlooked than sins of omission.

I have been telling you at random of a few incidents that throw some light on the education of a railroad man. By these few incidents I have endeavored to show that the railroad man who succeeds to any extent must be able to rise to most any emergency.

The earliest attitude of the public towards the railroads that I have run across I found the other day in a letter from a school board of Lancaster, Ohio, dated in 1828, in reply to a request for the use of the school house, as follows:

"You are welcome to the use of the schoolhouse to debate all proper questions in, but such things as railroads and telegraph are impossibilities, and rank infidelity. There is nothing in the Word of God about them. If God had designed that His intelligent creatures should travel at the frightful speed of fifteen miles an hour by steam, He would have clearly foretold it through His holy prophets. It is a device of Satan to lead immortal souls down to hell."

Generally that attitude is not prevalent today, but from the talk of some demagogues you might believe that railroads were an invention of the devil and that all persons connected with them were possessed of his spirit.

We in Delaware are peculiarly blessed with a dearth of those demagogues who go about spouting cynicism and pessimism against all successful works and men, and who attempt to put wrong ideas in the minds of people generally for their own personal benefit.

As far as the railroads are concerned these demagogues evidently get their ideas mainly from reading snatches of reports of investigating committees, commissions and courts. Why, you might as well expect to get a proper understanding of the health of a city by the study of the sick brought into a hospital, or a proper idea of the morals of a community by a study of divorce court proceedings, as to try to get a correct knowledge of the workings of the railroads by a cursory study of the reports of investigating com-

mittees. Of course, investigating committees can find rotten conditions in some few railways, just the same as they would find them in any other line of business.

These demagogues cry out against the rich men who own the railroads and sometimes are quite convincing that any injury that might come from unwise legislation affects only a few rich men. But what are the facts? The railroad securities of this country are not held by a few rich men; they are largely held by savings banks with 8,500,000 depositors, by life insurance companies with their thirty million policy holders, and in many instances by small investors. The Pennsylvania System alone has practically 100,000 stockholders—nearly half of whom are women—to say nothing of the thousands of bond holders.

The railroads are now and have been for the past few months enjoying an era of prosperity, but bear in mind that this is due to abnormal conditions, and is due to an increase of business only, as railroads are not allowed to increase rates as other industries. Previous to this wave of prosperity which is now sweeping the country, the railroads were suffering from much unwise legislation, which prevents the economy essential to success, and when the European war has ceased and we again live in normal times, the same conditions as before will doubtless obtain. The railroads are the arteries of our commercial fabric and essential to its health.

The railroads have more employes and are larger purchasers of supplies than any other industry in this country. During the last few years the diminishing net revenues of the railroads have forced them to curtail improvements of all kinds and to limit their purchases of supplies to the requirements of operating safely.

The falling off in railroad buying necessarily diminishes the production of those industries directly supplying the railroads, and forces a reduction in the amount of labor employed by them, which in turn affects the purchasing power of the entire community, and thus curtails the productive power of other industries which are largely dependent upon that purchasing power.

The net operating income of the Pennsylvania Railroad System, which serves the greatest traffic producing territory in the world, was, in 1914, less than in any previous year since 1904, though in the intervening period \$549,000,000 had been expended in addi-

tional transportation facilities. In 1914, the surplus of this system, after the payment of an average dividend of 5.93 per cent, had fallen to less than one per cent on the total capital obligation.

The intelligent and progressive railroad man today is not opposed to intelligent and enlightened regulation; he welcomes it. It protects him and his railroad, as well as the public, from the hare-brained and irresponsible. But he is in serious difficulty. He is not only up against Federal and State Commissions, but he is up against Federal and State laws, and it is not an unusual occurrence that there are conflicting orders and conflicting legislation between the States themselves, and the States and Federal Government.

If we had an unlimited treasury our task would be comparatively simple. We could build additional tracks, beautiful station buildings in all cities and towns, automatic signals, straight and level tracks, eliminate all grade crossings, have ideal conditions about which we all dream but know cannot be realized. We cannot do everything we should like, but we are trying to please our patrons, the public, as we know that public confidence is the foundation of our business and the hope of our prosperity. We want the public to feel that we are trying to serve them and in doing so we are bringing to bear the trained minds of our officials, who are conscientiously, earnestly and sincerely trying to work out the railroad's problems for the greatest good to the greatest number.

In the past mistakes have been made and where they have been serious their recurrence should be prevented by all proper means, but we are face to face with these serious problems—which cannot be solved by an ocean of indignation for previous wrongs. The only way to my mind that the railroad problem—to sum it all in one—can be solved is by a greater realization on the part of the railroad and the public that their interests are identical, the life of one is so interwoven with the life of the other that separate existence is inconceivable.

When both sides come to realize this great fact, mutual confidence will grow, public opinion will insist with all its mighty force upon fair treatment and will require of all our various governing bodies that they see to it that the effects and influences of govern-

ment be stimulating, that government be constructive towards those lines of endeavor which are a benefit to the country, and only destructive to those which are harmful.

At this time when our National Government is considering preparedness of the country as possibly a paramount necessity, it is all the more requisite that our laws, as at present framed and administered, should be as serviceable as they may be in aiding the railroads of the country in the vast services they would be called upon to render in connection with any scheme of preparedness.

A serious problem confronts both the railroads and the public today, it is a subject upon which much statesmanship must be expended in the next few years if the problem is to be solved to the credit of our nation. It is a problem that you younger men will have to wrestle with as citizens. I refer to the labor problem and particularly the railroad labor problem.

I will quote the concluding words of the arbitrators between the Locomotive Engineers and the Eastern Railways in 1912, which gives warning of a situation to which the public has been singularly indifferent:

"The food and clothing of our people, the industries and the general welfare of the nation, cannot be permitted to depend upon the policies and the dictates of any particular group of men, whether employers or employes, nor upon the determination of a group of employers and employes combined. The public utilities of the nation are of such fundamental importance to the whole people that their operation must not be interrupted, and means must be worked out which will guarantee the result."

Adjustment of working conditions has been considered a matter of private concern affecting only employer and employed. Yet the railway provides a service which is a necessity of the entire people, and the interruption of this service would prove to be a national calamity. Wage increases in this industry are usually sooner or later shifted to the shoulders of the people at large in the form of increased rates. The public's interest in railway labor controversies is supreme and should assert itself far more effectively than it has thus far in the consideration or adoption of any plans for wage regulation.

At the present time we see very little in the papers about labor movement on the railroads, but as a matter of fact the pot is seething hot. A movement is now on foot to secure the association of all the train organizations in one united demand upon the roads. On many of the railway systems federation of the four brotherhoods is in effect and on others working agreements exist between two or three of the organizations. Faced by this new ideal of a united labor force in an undivided country, the public may well give heed and devote its best thought to a consideration of its own interest in the outcome.

In recent negotiations and arbitration proceedings among other arguments a demand for standardization has been more or less vigorously pressed—the same pay for the same work in the same class of service, whether train operation is on single or double track, in mountainous or level country, in branch or main line service, on lines of heavy or light traffic. But the standardization wanted is standardization upward, as was very frankly stated in a recent controversy by one of the labor leaders, and leaves the high spots plainly in view.

The result of such standardization is to raise the lower end of the wage scale regardless of work performed or responsibility incurred. Results obtained under such conditions have been attained in a haphazard fashion and are attended by much discrimination.

There has been little in the process up to the present time that could be designated as scientific, such questions often being settled from the standpoint of immediate expediency.

No final solution of so perplexing a problem as that of the relation of capital and labor is expected within the near future, but we should begin at once to give serious thought to the whole question and thus lay the foundation for a larger participation on the part of the public in the settlement of disputes in which its interest is paramount.

In the foregoing remarks do not understand me that I am criticizing the individual or the great mass of railroad employees. I know of no finer body of men generally than the employees of the railroads today. They are hard working, conscientious men who are sincerely and devotedly doing their work—often under

most trying circumstances, at great personal inconvenience and discomfort and sometimes even at personal risk and danger. I would venture the guess that we have very slight, if any, fault to find with 98 per cent of the employes, and I am proud of the fact that it is my good fortune to work with them.

Many people have become excellent golfers or good performers on the piano without instruction, but the best golfers and players of the piano have all received instruction. While many men have made great successes who never attended college, a college education is recognized today as giving a man a distinct gain over the man who has not a college education. But a college education is just a start and no man can continue to advance unless he continues to study his chosen profession or life work. He must always be looking for the fundamentals. He must be a thinker. He must bring the working of a trained mind to his problems, some old and some new.

To grapple with the old problems he must be conversant with the failures and successes of those who have tried to solve them before and must avoid their pitfalls. To the new problems he must apply those principles in which he is grounded and which have become nature to him.

A college education if properly assimilated teaches one how to think. It is not so much the detail of what one has learned in college that he used afterwards, unless the student follows the purer sciences. College work trains the mind so that it follows logically from cause to effect or from effect to cause.

Above all, use common sense, and if you haven't already a sense of humor, endeavor to cultivate one. These two virtues, and I so name them advisedly, will carry you over many bumps and hard spots and save you much pain and mortification.

Be an optimist, not a pessimist. One of the best definitions of a pessimist I have heard is a person who is seasick on the voyage of life. Those of you who have been seasick can appreciate the definition. A pessimist is a difficult man in any organization. He throws more or less cold water on all propositions; he is not a pleasant person to have around. It is difficult for any one to co-operate with him.

The valuable man in any business is the man who can co-operate with other men. Men succeed only as they utilize the services and ideas of other men. In this connection, I want to read you in closing some words of President Hadley, delivered in a baccalaureate sermon a few years ago, which to my mind expressed a wonderful truth:

"In order to accomplish anything great, a man must have two sides to his goodness—a personal side and a social side. He must be upright himself, and he must believe in the good intentions and possibilities of others about him. We do not, I think, recognize the second of these things to an equal degree. We do not appreciate how necessary it is for a man to believe in those about him just as far as he can and co-operate with them just as fully as he can. Yet this also is a condition of leadership. The man who lacks faith in other men loses his best chances to work, and gradually undermines his own power and his own character. The man who is cynical, whether about women, or business, or politics, is assumed—and in nineteen cases out of twenty with full justice—to be immoral in his relations to women or business or politics. The man who has faith in the integrity of others in the face of irresponsible accusation is assumed to have the confidence in others' goodness because he is a good man himself. This is why people will follow the optimist even though he is sometimes wrong, and shun the pessimist even though he is sometimes right."

AN ANALYSIS OF THE WATERWAYS MOVEMENT

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I.

We have been witnessing for many years in this country a very powerful and persistent agitation for the rehabilitation and improvement of water transportation. The movement began as long ago as 1895, and by 1903 had gained enough momentum to vote an appropriation of \$101,000,000 for the improvement of the Erie canal in New York. But the widespread and intense popular interest in the movement really dates from 1906. In that year two history-making meetings were held, the St. Louis convention and the Washington session of the Rivers and Harbors Congress. Out of the former grew the organization known as the Lakes-to-Gulf Waterway Association; while the latter led directly to the appointment by President Roosevelt of the Inland Waterways Commission.

This commission made an extended investigation of waterway possibilities in the United States, ending with a memorable and joyous excursion down the Mississippi in 1907, with President Roosevelt as the guest of honor. "On the average each river town showed more spectators standing out to salute the presidential party than the entire population; while day and night the air was rent with acclamation of voices, steam whistle, shrieking siren, salvo of guns, and roar and rattle of fireworks." There followed a veritable harvest of congresses and conventions in a score of states, and there has been but intermittent abatement of zeal in the ensuing years. The question has been at times of absorbing political interest. In New York, in 1903, the referendum on the Erie canal proposition called out the largest referendum ever known; while in Illinois waterway appropriation has been the prize around which has centered for years a bitter struggle of rival leaders and political factions which has disgraced the very name of the state.

In the way of practical achievement the agitation has resulted in the appropriation of \$101,000,000 for the enlargement of the

Erie canal, already noted; a congressional authorization of the improvement of the Ohio river at a cost of \$60,000,000; the recent passage of a bill in Illinois providing for the improvement of the old Illinois and Michigan canal as a connecting link between the Drainage canal and the Illinois river; and numerous appropriations for minor projects in pursuance of our congressional policy of "pork barrel" legislation. There remain as yet without financial backing a veritable host of projects, some definitely outlined and surveyed, others ill-defined and more or less chimerical, the total cost of which would reach many hundreds of millions of dollars. The causes and influences lying back of this widespread and ambitious program are peculiarly interesting when studied in connection with the economic aspects of the transportation problem. The movement is a very illuminating example of the utterly haphazard and ill-considered way in which we attempt to promote the general welfare through the agency of government.

II.

As to causes, the waterways movement appears to be a part of the general movement for the conservation of our national resources. Until the last decade American orators and writers have almost universally regarded our resources as unlimited in extent. But we have recently been forced to face the cold fact that there is a limit to the prodigality of nature, even in America; that we are not a country of "inexhaustible resources," and that out of regard to posterity extravagant waste must be checked. The nation has paused at last to reflect, and to lament the waste and wreckage strewn along the pathway of its progress. Our waterways are conspicuous reminders of our improvident past. "At Cincinnati and Pittsburgh hundreds of boats have given place to tens. When once on the Missouri there were sixty, there now remains but one to remind us of the departed glory of our waterways. Along our wharves old gangplanks, and anchors, and broken machinery are tangled in the grass growing in the crevices between the cobblestones." Railways parallel the banks of great rivers, deserted save for a few small boats of uncertain schedule, or run in the very channels of abandoned canals. Such spectacles compel reflection, and they recall the early days of water transportation in this country. There is a lingering glory about our great navigable rivers and inland seas that is not easy to dissipate. The waters which led Marquette and La Salle to the heart of an unexplored continent, the rivers which

carried the American pioneer beyond the Alleghenies to the great middle West, and on whose banks he built his home and reared his family are associated with a most romantic history.

Again, the very great part waterways played in the actual development of our country prior to the Civil War has served as a powerful influence in support of their resuscitation. In our early history they long served as the chief unifying agencies in our national life as well as the great avenues of commerce. Where canals were built, villages and cities sprang up as by magic, wealth poured into the contiguous territory, and industry thrived in the entire region. Today the inhabitants along proposed water routes again see visions of reviving industries, of booming towns and cities, of fleets of barges laden with the commodities of commerce borne swiftly along the surface of the waters. It is an alluring picture; and it is widely believed that all that is needed to make the picture a reality is the improving and connecting of our rivers and lakes.

By far the most important argument in favor of waterways is that water transportation is decidedly cheaper than rail transportation. Various estimates of the great reduction in transportation charges to be affected by means of waterways have been made, and it is generally believed that the cost of water transport is but a fraction of that by railway, the estimates varying from one-half to one-tenth and even one-fourteenth. Such convictions obviously furnish to the advocates of waterways the most practical of campaign weapons.

Accompanying the belief that water transportation is inherently more economical than railway transportation is the conviction that the railroads, having monopolized the transportation of the country, are charging extortionate rates, which an unwilling but helpless public must pay. It is pointed out that wherever railroads are subjected to water competition the rates are substantially lower than elsewhere; that the winter rates on grain from Buffalo to New York are about one cent a bushel higher than when the Erie canal is open. The railways should therefore be subjected to competition from government waterways. Whether the waterways carry the traffic or not, the potential water competition will force the railroads to carry at a low rate, to the benefit of American shippers. Waterways are, consequently, a means of railroad rate regulation.

Finally, the example of foreign waterways has had a great influence upon the movement in this country. It is well known that

in Germany, France and Belgium waterways have continually served as public carriers. They exist along with the railroads, complements one of the other. The Manchester ship canal is said to have solved the great transportation problem of that city, and throughout England there has been for some time a movement for the resuscitation of inland waterways. Vast sums of money have been spent upon these European waterways, with success apparently sufficient to warrant the present increasing appropriation in nearly every country on the continent. Nearer home, Canada is bestirring herself, and planning a great ship canal to the lakes. If waterways are successful abroad, it is reasoned that they should prove likewise successful in America.

III.

Turning now to an analysis of the waterway propaganda, it is surprisingly easy to show that the movement has been largely ill-considered and ill-advised, and that, in the main, it is economically unsound. The question of the relative cost of water and rail transportation is obviously of paramount consideration. The popular argument that water transportation costs only a fraction of that by rail runs somewhat as follows: The average charge made by all the railways of the country for the calendar year 1907, for example, was 7.82 mills per ton-mile. On the Great Lakes the charge was .8 mills per ton-mile and on the Erie canal about 3 mills per ton-mile. A dollar then will carry a ton of freight the following distances: By rail, 127 miles; on the old Erie canal, 333 miles; on the Great Lakes, 1,250 miles; and on the enlarged Erie canal nearly 2,000 miles.

In considering these statistics of comparative cost it is necessary to inquire if the term *cost* has the same meaning in the various cases compared. The *costs* given above, it will be noted, are synonymous with rates charged. Now, what is included in the making of rates in the various cases, and are rates and costs fairly synonymous terms?

The average freight rate which we have been considering was levied so as to secure to the railways a profit upon the entire capital investment of the railways of the country. The cost of building the roads, cost of equipment, of maintenance, and of operation, that is, the actual hauling expenses, all were considered in the adjustment of the rates on the railway.

Let us now pass to a consideration of what is included in the term *cost* as used in connection with the waterways. It is said that a dollar will move a ton of traffic on the Great Lakes a distance of 1,250 miles, as against 127 miles on the railways. But since the Great Lakes constitute a highway ready made by nature, the rates charged there need be merely sufficient to yield a reasonable profit on the investment in the ships, in addition to meeting the expenses of operation. Naturally the rates under such conditions would be much lower than if they had to earn a profit on a tremendous investment in the highway itself. A comparison of railway rates with the charges on canals, which, like the railways, are artificial highways, evidently affords a fairer basis from which to draw conclusions.

It is contended that one dollar will move a ton of traffic on the railways only a distance of 127 miles, as against 333 miles on the present Erie canal; and that with the opening of the new barge canal this distance will be extended to about 2,000 miles. What is meant by cost as applied to the Erie canal? It was built by the state of New York and donated to private use. Any one who desires can build a boat and engage in the carrying trade free of charge on the state's highway. If he can earn in addition to the operating expenses a reasonable profit on the cost of a small boat or barge he is satisfied. Thus, whereas the railway rate is fixed to cover a profit upon the total cost of the highway, equipment, upkeep, and operation, upon the railways, the rate on the Erie canal has to cover no part of the enormous expenditures involved in the construction and maintenance of the waterway itself. Thus the cost item which is by all odds of chief importance is omitted from computation. The cost of building and maintaining a canal, as in the case of a railway, is always the chief outlay connected with the transporting of goods. Indeed, it is the tremendous amount of fixed capital involved that particularly distinguishes the transportation business. Consequently, in comparing the relative cost of two rival modes of transit, to omit the enormous construction and maintenance expenditures in the one case, and to include them in the other is totally to invalidate the conclusions drawn. Yet this is the method that is commonly employed in proving water transportation less costly than transportation by rail.

The latest figures indicate that the total cost of enlarging the Erie canal will be not \$101,000,000, as originally estimated, but ap-

proximately \$135,000,000. This is an average of \$330,000 per mile. This is to be compared with an average railway capitalization of less than \$60,000 per mile, for the country as a whole, and with a present day cost in the eastern states of probably not more than \$100,000 per mile. At least three fully equipped double-track railways could be constructed between Buffalo and the Hudson for the cost of the new Erie canal.

It is argued, however, that since the state will charge no tolls on the canal that this enormous capital cost need not be borne by the shippers. True, but it must be borne by some one. If the state builds and keeps in repair a canal, which is donated to the use of shippers free of charge, interest on the bonded indebtedness and the annual maintenance charges are not thereby eliminated. They are merely shifted to the taxpayers and remain quite as much *costs* of transportation as when paid by shippers in *toto*, as in the case of rail transportation. In fact, the people of New York are going to find their taxes increased in consequence of the expenditures on the Erie canal by over \$7,000,000 annually.

To get an accurate comparison suppose New York state, instead of enlarging the Erie canal were to construct a double track railway for freight purposes only, and were to donate this to a company free of interest charges, and with all costs of maintenance and upkeep defrayed out of the public treasury. Suppose a railway company having therefore to cover merely direct handling and haulage expenses, including a fair return on the cost of rolling stock, and you have the parallel of present day canal operation. With such aid is it not probable that the railways could quote rates less than 7.82 mills per ton-mile? The fact is, that thus considered, with all items of cost included on both sides of the equation, water transportation costs substantially more than rail transportation.

The causes for the general belief in the cheapness of water transportation are not far to seek. Shippers are obviously interested only in costs to themselves directly, and they need not therefore go behind the question of rates. So far as the shippers are concerned, then, it is merely an instance of special interests, though perhaps a less conscious interest than is often the case. So far as the popular view is concerned we have here an excellent illustration of what Bastiat has called "the seen versus the unseen." What is seen is that water rates are lower than rail rates. What is not seen is that the taxes must be added to the rates to find the total

cost. Rates, officially quoted rates, appear to be complete evidence. The point involved in the "unseen" aspects of the case is after all very simple when one thinks about it; but as a matter of fact it has been absolutely overlooked by every popular writer in favor of waterways, by the expert commissions of this and other countries, and even by some economists.

IV.

The experience of European nations, contrary to the general rule, does not bear out the contention that water transportation is cheaper than rail. The same faulty analysis of cost has been made with reference to European waterways that we have observed with reference to our own. It has been assumed that the rates quoted tell the whole story, when as a matter of fact the rail and water rates are based upon entirely dissimilar computations. In Germany, for example, the water carriers do not charge tolls high enough to cover the overhead charges, and in consequence there is required a heavy annual subsidy. In the year 1905, for instance, the waterways of Prussia showed a deficit of \$3,523 for every mile; while the railways yielded a net profit of \$1,814 per mile. It is the German policy, indeed, to use the profits from railroads to offset the deficit on the waterways. In view of this can a quotation of mere rates prove waterway transportation actually cheaper than that by rail? Suppose the situation were reversed, and that the railways were run at a heavy loss, while the waterways were conducted at a handsome profit. Would not the rates then show the railways to be more efficient carriers? It must be borne in mind in this connection that since the German government controls both railways and waterways, the fixing of rates is a mere arbitrary matter, and need have no relation whatever to cost of service.

Investigation in detail reveals the surprising fact that none of the canals of Europe, and but few of the rivers, serve economically as carriers of traffic. When indirect costs are included water transportation is nearly always found to be more expensive than that by rail.

Without going into a detailed consideration, we may briefly summarize the transportation history of the past century. In the first half of the nineteenth century the canals of both Europe and United States were of enormous influence on economic development. During these years, whether canals were publicly or privately

owned, tolls were everywhere levied upon the water traffic sufficient in amount to cover not only the entire cost of operation and maintenance, but to cover as well the original cost of construction of the waterway itself. Indeed, since the utter inability of the old fashioned stage roads to compete with them gave the canals a virtual monopoly of traffic, they were exceedingly profitable sources of investment.

But in all the principal countries of the world a tremendous change took place about the middle of the nineteenth century. The invention of the steam locomotive and the steel rail, with its great load carrying capacity, together with the perfection of the telegraph and the telephone and the development of the corporate form of industry, have ushered in a second industrial revolution perhaps even more far reaching in its consequences than the one half a century earlier.

With the development of railway carriers, industrial enterprise, which had hitherto clung close to the banks of the waterways, now moved out from the river valleys and covered the entire area of a country. The ability of the railways to strike out from the old beaten lines of travel, to cross prairie and mountain, and to extend their lines to the farthest corners of a country, completely revolutionized commercial development. The railways spread like a great net over a country, and almost no section, however remote from a navigable water route, is now without more or less adequate transportation facilities. By means of sidings and spur lines they can extend to almost every recess of great urban communities, as well as to the heart of mining districts where the depressions from exhausted mines make canal building virtually impossible.

Rapid and economical shipment of goods is no longer confined to trunk line water routes aided by such additional lines as the physical character of a country allows; for by means of a modern railway system traffic may be sent to all the points of the compass, and by virtue of the standard gauge of tracks, to any destination, however distant from the original place of origin, without transshipment. In a modern industrial state, where division of labor has been carried to a great extreme and when traffic is assembled from and distributed over widely separated areas, this is of a paramount importance. Herein, indeed, lies that tremendous superiority of the railways in the carrying of traffic under modern conditions.

It has been found that in Europe no less than in the United States there has occurred *pari passu* with the development of rail-

ways in the third quarter of the nineteenth century a rapid decline in the amount of traffic carried on inland water routes. This decline has continued to the present day in England and the United States, and it has been checked only by the extending of government subsidies to the waterways. In order to prevent the almost complete diversion of traffic from the waterways it has been necessary for governments to assume all, or nearly all, the fixed charges connected with water transportation, to pay for building, equipping, and maintaining the water routes, and to furnish them free of charge to the water carriers. When thus relieved of all save the mere direct cost of operating the boats, it is usually, though not always, possible for the water carriers to offer rates which enable them to compete with railways, which are entirely self-supporting. Even then, it is not infrequently necessary to protect the waterways still further from railway competition by arbitrarily compelling the railways to quote rates from twenty to fifty per cent higher than those by water, as is the case in France and Belgium; and although the cost of transportation by water, when to the rate charged by water carriers are added the taxes levied by the state in support of the waterways themselves, is usually much greater than that by rail, many people have still clung, strange as it may seem, to the belief that canal transportation is much cheaper than that by rail.

There can no longer be any question, however, that so far at least as canals are concerned, the cost of transportation, all factors included, is almost universally much greater by water than by rail. It is only in the case of very short canals which connect long stretches of naturally navigable waters that they can have any economic justification at the present time. While canals satisfactorily served the needs of an earlier period, their day, like that of the sickle, the hand loom, and the spinning jenny, is now forever past. Precisely as the canal supplanted the horse in the carriage of through freight, so in turn has the railway, in the course of industrial progress, come to take the place of the canal in the field of transportation. To attempt now to return to the antiquated system of transportation of a half century ago, or to make canals an integral part of a national transportation system, whether for the carriage of high-class or low-grade freight, it matters not, is to attempt to turn backward the clock of time.

In the case of rivers, however, the situation may at times be somewhat different. But, after all, river transportation is usually

analogous to that by canal, for comparatively few of our streams are really natural highways of commerce. As a rule they are navigable for the purpose of modern transportation in name only, rather than in fact. So long as the cost of canalization of a river amounts to forty, sixty, or a hundred thousand dollars a mile, it belongs in the same category as a canal. A river like the Rhine, whose banks are firm, whose gradient is gentle, whose water supply is constant, and the cost of regulation of which is almost negligible, may, indeed, be regarded as a natural avenue of commerce; but a river such as the Mississippi, with ever caving sides and shifting bottoms, with periods of alternating floods and droughts, and the control of which is, in the opinion of engineers, a greater task than the building of the Panama canal, is no more to be regarded as a natural highway of commerce than any artificial channel whatsoever. The test of the commercial success of such a river must lie in the cost of rendering it navigable for the purposes of modern transportation. It is only in rare instances that river transportation can be made as economical as transportation by rail.

V. .

The argument that we have just been making relates to the purely transportation feature of waterway development. It remains for us to consider some of the indirect or allied gains that might come from the development of waterways.

By these incidental advantages is meant such gains as would come from the development of waterpower, the prevention of the periodic waste in consequence of floods, and the reclamation of low-lying riparian lands. In a still broader way the problem of river control is bound up with the whole program embraced by the term conservation of natural resources. Waterways, water power, forestry, irrigation, reclamation of desert and flooded lands should go hand in hand and be apprehended as one comprehensive problem for the nation to solve. This theory must be regarded as usually pertinent in connection with river improvements, though seldom so in the case of canals; and one can be in hearty sympathy with the viewpoint, provided that it is not assumed that the cost of the waterway improvement will be covered in full by the purely transportation gains which accrue, and that the allied benefits will therefore be so much net gain to society. Unfortunately this has been the almost universal assumption of waterway advocates; an as-

sumption which is based on the belief that water transportation costs less than transportation by rail. But if investigation of the Mississippi river, for instance, shows that extensive improvement for transportation purposes would be economically wasteful, it follows that the related aspects of the problem must be viewed in a quite different light. It may conceivably be the case that the improvement of the Mississippi river can still be proved warrantable as a part of a general conservation project; but to prove this involves showing that the gains on these non-transportation grounds would in the main be sufficient to cover the expenditure involved. If the transportation side of the problem thus becomes subsidiary, the engineers must conduct their investigations in ways different from what was appropriate when transportation was the first consideration. To take one case only, the reclamation of swamp lands and the prevention of floods might not require the construction of a 14-foot or a 24-foot channel, or the erection of gigantic locks such as many consider necessary for transportation purposes. Levees alone, constructed at relatively small cost, might prove entirely adequate. Incidentally, the river thus regulated would afford some transportation facilities. It is possible, also, that a comparatively small additional expense would result in a considerable increase of traffic. Hence transportation should still enter as a factor. But in any event it is clear that the problem has to be quite differently conceived when transportation is not the chief end sought, or when the direct benefits of transportation are not sufficient to warrant the project. There is need of some thoroughgoing investigation that will differentiate these aspects of the question.

VI.

Quite as astonishing as our failure to analyze the meaning of cost of transportation before appropriating enormous sums for waterway development, has been the failure to recognize the imperative need of terminal facilities, such as docks, wharves, freight depots and transshipping facilities, and to ascertain what depth of channel is necessary for the most economical boat traffic.

Campaign orators, chambers of commerce, specially interested shipping associations, waterway conventions, and state and national commissions had for many years portrayed the wonderful possibilities of water transportation and fanned the enthusiasm of the public to a white heat, before there was even so much as a reference to the terminal question. Indeed, it was not until 1909 that it made

its belated appearance in a government report, six years after the decision to rehabilitate the old Erie canal at a cost of over \$100,000,000.

But when it finally dawned upon us that a canal without terminals would be a sorry competitor indeed for modern railroads, we buckled to with characteristic American courage and promptly shouldered the full responsibility of providing the necessary terminal facilities, just as though we had long been preparing for this very task. The United States bureau of corporations was delegated to make an exhaustive report on the subject, and in 1909 the state of New York appointed a Barge Canal Terminal Commission for the purpose of investigating the terminal situation in New York with a view to making an appropriation. After an extensive investigation costing \$10,000, the commission came to the important, though obvious, conclusion that "it is just as necessary that there shall be frequent, convenient, well-established, thoroughly equipped, and wisely managed depots all along the canals and waterways, where canal-borne freight may be received, cared for, and shipped away, as it is necessary that the railroads shall have their freight depots."

In 1911 the legislature, acting upon the commission's report, appropriated \$19,800,000 for the purpose of constructing terminals for the barge-canal system. This was approved by a referendum vote of the people in November of that year. Henceforth the development of these necessary terminal facilities had to be included in estimating the total cost of the undertaking.

As in the case of the terminals, the state of New York has gone blindly ahead building its new canal without knowing what depth of channel is either desirable or necessary. It now appears that quite as serviceable a canal might have been provided at perhaps only a fraction of the present cost. The depth of the new Erie canal at the locks is to be 12 feet. No good reason has ever been given for this particular depth. The depth required was a mere guess; as usual, investigation could be left until afterward.

At last in 1911 the Barge Canal Terminal Commission recommended that it was important that a study be made of the best type of boat for use on the canal, but the advice passed unheeded.

Just recently, again, the state engineer has urged that "one of the matters that should receive the early attention of the state is that relating to the size of boats for navigation upon the opening of the barge canal." It is apparent, therefore, that even yet there is no definite knowledge as to what is the most feasible boat for the canal or what its draft should be. It does not appear that a depth of 12 feet is in fact required.

On a canal, curves and channel width are very important determinants of the size of boats that may be used, more important indeed than the depth of the channel. The Erie channel is to be but 75 feet wide in places and hence 36 or 37 feet will measure the width of barges that can be used while permitting them to pass each other. Boats 300 feet long can make all the curves in the canal, but as they will take up the full width of the channel while rounding the worst bends, they would have to slow down to a speed of only about two miles an hour at those places, and would seriously interfere with other traffic. For this reason a barge 150 feet in length, 36 to 37 feet wide, with a capacity of 1,500 or 1,600 tons, has been generally favored. Many believe that tows of smaller barges of 700 or 800 tons burden each, four of which could be locked at once, would be even more satisfactory. In Germany, where canal transportation has reached its greatest development, barges of 600 tons' capacity are regarded as the most economical for purposes of canal transportation. The far greater cost of larger canals much more than counterbalances the slight gains that go with larger barges.

A great depth of channel is not required for economical barge transportation. For instance, the fleets of coal barges on the Ohio and lower Mississippi rivers, of which so much has been written, have to be content with a depth of 6 feet and even less for the greater part of each year. On the Rhine in Germany, barges of 2000 tons' capacity regularly ascend the river as far as Mannheim, where the low mean channel depth is only 6.52 feet. Between Mannheim and Strassburg, the head of navigation on the Rhine, the low mean depth is but 3.91 feet, but barges of 800 tons burden reach the latter port. In fact, the greater part of the vast canal traffic of Europe is carried on canals with a depth of less than 7 feet. Evidently, the failure of the old Erie canal was not primarily due to its inadequate depth. Evidently, also (even

assuming canal transportation is economical), a great part of the present outlays in New York is but a needless sinking of state funds. While the greater width may have been required, the extra depth appears to have been almost, if not quite superfluous. It will be interesting to see, however, if other localities do not cheerfully go and do likewise.

THE FEDERAL VALUATION OF UTILITIES*

BY CHARLES A. PROUTY,

Director of Valuation, Interstate Commerce Commission.

It has been objected that the valuation of our railways now being made by the Interstate Commerce Commission will not be worth its cost. But this is not a question of expense. While the cost will not in fact be excessive, having relation to the interests involved, the thing must be done sooner or later and the sooner the better.

The United States is today trying an experiment which has never been worked out to a conclusion in the past. The revenues of our railroads for the last fiscal year exceeded \$3,000,000,000. The property which produced this enormous income is private. This private property the government, state and national, finds it necessary to "regulate" and in this process of regulation it is doing or preparing to do, among other things, the following:

To determine the amount of securities which shall be issued;

To fix the standards by which the roadway and equipment shall be constructed and maintained;

To prescribe the schedules upon which trains shall be run and the train crews which shall be used in the operation of those trains;

To determine the charge which may be made for every service rendered by the common carrier.

I have, for one, long believed that the government must possess and exercise when necessary all the above authority. In no other way can society protect itself. And if these powers are wisely exercised there still remains a broad and satisfactory field for the scope of private enterprise, but it must be obvious that such authority may be pushed to a point where little opportunity for initiative or direction is left to the owner of this capital.

Upon the unreasonable exercise of the regulating power there are two limitations.

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The first is economic. The billions which are already invested in these properties were put there, for the most part, because the investor believed that his investment would be safe and his return a fair one. But for this belief only a fragment of the enormous sums which are in fact invested in our railways would ever have gone there.

Large sums will be required for the further development of these agencies of transportation in the future. How large these sums will be depends upon the industrial development of this country and the demands which are made upon them, but it is beyond doubt that within the next half century enormous amounts will be required. Whence is this money to come? It must be obtained, unless the government itself is to take over or finance these properties, exactly as the present investment has been obtained—from the private investor who will invest for precisely the same reason in the future as in the past. Unless the investing public believes that the money paid for a railroad stock or a railroad bond will be safe and will yield a just return, it will not seek that investment.

Within certain limits the government can impound the money which has been invested and compel additional investment to protect that already made. But this process can continue but a short time and can produce only comparatively slight results. In the near future new money must come from new investors.

The second limitation is one of law. The federal constitution guarantees to the private owners of our railroads and other public utilities a fair return upon the fair value of the property devoted by them to the public use.

It must be evident upon the most superficial consideration that the value of the property is a basic fact lying at the foundation of all intelligent treatment of these utilities. No commission can determine the amount of securities to be issued or the rates to be applied, nor can it even fix the standards of construction, maintenance and operation without an accurate knowledge of this fact. The government itself cannot intelligently make and apply rules which shall protect the public upon the one hand and do justice to the investor upon the other without this same knowledge. In dealing with this question there must be a point of departure. No

rule of universal application can be devised which will not work more or less injustice as to the past; given a point of beginning, it is possible to formulate rules which will divest the future of that uncertainty which will most certainly deter legitimate investment.

The importance of reaching a definite conclusion as to this value is becoming every day more obvious. But what is the "fair value" of this property and how is it to be determined?

One school of thinkers declare that we should ascertain as accurately as possible the total amount which has been invested in a given enterprise, and that the amount of this actual investment is the value, assuming that the management has been honest and intelligent.

Another class contend that not the amount of money which has been paid into the enterprise from its inception but the actual cost of the items of property which are now being devoted to the public service, with or without depreciation, should control.

A third theory is that the cost of reproducing the property as it exists under present conditions is the measure of value. If the cost of construction has advanced, the utility gains; if it has declined, the utility loses.

A fourth class accept the reproduction theory but urge that not the cost of reproduction new but the cost of reproduction new less depreciation is the true test. The owners of the property should be allowed a return upon the cost of that property in its present state, not upon the theory that it is new.

The Supreme Court of the United States has apparently said that no one of the above methods can be used alone but that the value of a property must be determined upon a broad consideration of all these aspects and perhaps others.

Congress plainly intended by the Valuation Act of March 1, 1913, to provide for the collection of all those facts which need to be known in applying any one of the above theories or any combination of them. The commission is required to ascertain and report:

- Original cost to date;
- Cost of reproduction new;
- Cost of reproduction less depreciation;

Not only is the commission required to give these facts as to the property as a whole but it must report in detail as to "each piece of property." It is also required to state any other values or elements of value which may attach to the property; to give certain

facts as to lands; to report all aids and donations of every kind; to give a complete corporate and financial history of the property and its owners and users past and present.

It was the manifest intention of Congress to provide for the marshaling of every fact which could bear upon the value of the public utilities embraced, for the act includes not only railroads but telegraphs, telephones and pipe lines when subject to the jurisdiction of the commission.

For the purpose of discharging the duties thus imposed upon it the commission has created a Division of Valuation. This division decides nothing; it simply gathers the information called for under the direction of the Commission and turns it over for its use. All questions arising in the prosecution of the work must be passed upon by the commission itself.

The work of this division divides itself into three general classes—engineering, land, and accounting. To show cost of reproduction new and cost of reproduction new less depreciation, exclusive of land, is an engineering problem and to deal with it an engineering force has been organized. The requirement that each piece of property shall be dealt with in detail, as thus far interpreted, requires the preparation of an inventory which shall list the property of the carrier by units; that is, the inventory will show the number of yards of grading in the property or a given section of the property, distributed between the different classes, as earth, solid rock, loose rock, etc.; the number of ties, the kind, whether treated or untreated; the number of tons of rails distributed in various classes; the bridges, the buildings, etc., all itemized so that it is possible to know the price applied to each item.

In the making of this inventory or in the verification of the inventory when furnished by the carrier, the engineers of the commission actually examine the property. The quantities are measured and within certain limits the various kinds of property are enumerated. It is not in the nature of things possible to observe every article of property, nor is this at all necessary in order to reach a reliable conclusion, but the government does examine a representative portion which is supposed to fairly represent the whole. In the matter of ties, for example, which is one of the large items in the cost of the average railroad, no attempt is made to count every tie but a certain section of each mile selected at random is counted.

The engineering part of this work involves a much greater expenditure of time and money than do the other branches. At present about 1,000 persons are employed in this branch.

The engineering work was developed slowly. It was uncertain at the outset just what ought to be done or how it should be done. It is only within the last six months that this work has been, so to speak, in full swing. At the present time about 4,000 miles of line per month are covered by our engineers. It is hoped that the present force will dispose of substantially 50,000 miles a year. There are in the United States about 250,000 miles of line and of this nearly 50,000 miles will have been surveyed by January 1. Should the present rate of progress be maintained, therefore, the surveys should be well towards completion in four years from the first of next January.

One of the most difficult things connected with this work is the statement of depreciation. An article of property may lose its value under the action of the natural elements alone. The tie decays whether used or not although the use may hasten the end of its life. The life of a rail depends almost entirely upon the amount and character of the traffic which passes over it and the quality of its maintenance. The bridge goes out of service because it is no longer of sufficient size to support the heavier loads which are placed upon it although otherwise in perfect condition. The problem of combining these different forms of lessening value, giving to each its due and proper weight in each case, is an extremely perplexing one.

The stating of depreciation also adds enormously to the work itself since if that is to be done with any degree of accuracy a careful examination is necessary where otherwise a simple check might suffice.

The units when ascertained are being assembled and the condition of depreciation is being stated so that nothing remains save the application of unit prices. Up to the present time no final prices have been applied. The prices themselves can only be ascertained and certain questions arising in their application can only be answered by a comprehensive examination of the records of the carriers. If that examination were confined to the few carriers now under valuation, the conclusion might be altogether misleading. This delay in the application of prices will not cause any delay in the final completion of the work since when the application of prices is fairly begun it can go forward rapidly.

Some of the most delicate problems in the valuation of railroads arise in connection with lands. The proportion of value which land bears to other property varies with different carriers; taking the country as a whole it is perhaps 25% of the whole. A considerable portion of this present value is unearned increment; that is, the increase in value of the naked land since it was acquired by the carrier, and there will be sharp controversy as to how far the carrier is entitled to the benefit of this element of value which has cost it nothing.* In many cases the privilege of using its right of way for railroad purposes has been donated to the carrier without a conveyance of the fee itself. For example, the government of the United States gave to the Northern Pacific Railway the right to use for railroad purposes a strip of land four hundred feet wide through all government lands from the head of the Great Lakes to Puget Sound. What value is to be assigned to that grant in putting a value upon the property of the Northern Pacific Company?

It is generally understood that it costs a railroad company more to purchase a right of way than the value acre for acre of adjacent lands. In the past it seems to have been assumed that the value of the right of way would be determined by inquiring what it would cost the railroad to obtain that right of way at the present time and the method employed was to ascertain the value of similar adjacent lands and to increase the value thus obtained by some multiple.

The Supreme Court of the United States in the Minnesota Rate Case apparently held that the reproductive method was not the proper test of present value. Its decision apparently was that the present value of railroad lands was ordinarily limited by the value of adjacent lands of a similar character unless the railroad had actually paid a greater amount. The value of its lands would therefore be ascertained by determining the number of acres used and applying the price of similar adjoining or adjacent lands. This sum would be the present value unless that railroad had actually paid a greater sum in the acquisition of the lands.

Up to the present time the Division of Valuation has been ascertaining those facts which would enable the Commission to fix the value of railroad lands upon this basis. It has divided those lands

*But to which it has contributed the essential element of transportation facilities. In 1850 with 9,000 miles of railway, the wealth of the United States was only \$7,135,780,000. In 1912, with 246,000 miles of railway it was \$187,739,000,000, at least 50 per cent of the increase being due to the railways. S. T.

into various classes, has determined the amount of each class, and has ascertained the value of similar adjoining and adjacent lands. It has also ascertained in all cases where this was possible the original cost of the land.

The carriers earnestly insist that the above interpretation of the decision of the Supreme Court is not correct and that the present value of their lands is what it would cost to obtain those same lands at the present time. The Commission itself has not yet interpreted the Minnesota Rate Case, nor has it determined how the present value of these lands shall be estimated.

To carry forward the land work a land section of the Division of Valuation has been organized. This work necessarily comes after that of the engineers and the organization itself was subsequent to that of the engineering section. At the present time 70 men are employed in this service who cover from 2,500 to 3,000 miles per month. This force in the near future will be increased to a point where it can keep abreast of the engineering work.

A third section of the division has been organized for the conduct of its accounting work, which divides itself into three general classes:

1. Corporate and financial history.
2. Original cost of the property now in existence.
3. Studies in prices and depreciation.

Under the first head the corporate and financial history of the property, its owners and users is dealt with. The company which originally constructed the road is ascertained and its history traced down to the present time, thus showing in detail the development of the system.

In this work special attention is given to the issue of stocks, bonds, notes, and all other forms of obligation. The amount and the time of the issue is stated, together with its character and the consideration received, whether money, property or services. If money, the actual amount realized by the company is shown and what became of the balance. No attempt has been made thus far to estimate the value of services or of property received for securities.

An attempt is made to show the amount of money received and expended by the corporation during its entire life and to state the purposes for which the expenditures have been made. It is never possible to do this exactly and the result is often of little value.

The general purpose is to ascertain the amount of money which has been actually invested in the enterprise for the purpose of comparing that amount with the present capitalization of the company and the reproductive cost of its property.

Up to the present time the original cost referred to in the Act has been treated by the Division of Valuation as an accounting proposition; that is, it has been assumed that Congress intended to inquire for the original cost as shown by the books of the carrier. Our accountants have been endeavoring to give, as required by the Act, "in detail as to each piece of property" original cost to date. This has been generally found to be impossible. Previous to 1907 the books of the carriers were not so kept as to disclose this information in a reliable and accessible form; but that fact can be ascertained as to certain classes of property like land and equipment, and also with respect to many structures, as bridges and buildings when of considerable size. Wherever the information exists in available shape it is being compiled and will be reported.

Finally the accountants examine the account books and other records of the carrier for the purpose of ascertaining the prices actually paid by it in recent years for the various kinds of property which enter into the construction of the railroad and its equipment as well as the cost of erecting certain structures and of performing certain pieces of work. They also determine the life of various kinds and articles of property and of parts of other articles as shown by actual replacements and renewals. The information thus accumulated is of first importance to the engineer in fixing the prices to be used in his estimate of reproductive cost and in his statement of depreciation.

There are now employed in the accounting section 155 men and it is probable that this force must be somewhat, although not greatly, increased.

The division has also commenced an inventory of telegraph property and is covering at the present time about 6,000 miles of line per month. This work would be carried forward at a more rapid rate were it possible to obtain from the owners of this telegraph property the pre-inventory information which is required. The owner must furnish certain facts and documents before the work of the government can begin and there is a limit to the amount which can be reasonably called for.

The Valuation Act requires that the valuation shall be kept good when completed; that is, that the Commission shall inform itself of extensions, additions and retirements and shall correct its valuations from time to time accordingly. This is a most important provision and what shall be finally done under it is a matter of very grave concern. The Commission has already passed an order requiring carriers whose property has been inventoried to keep a detailed account of all changes and make report of the same to it. Exactly how the information thus furnished will be used in correcting the valuation has not yet been determined.

FEDERAL VALUATION OF THE RAILROADS*

BY THOMAS W. HULME,

General Secretary, Presidents' Conference Committee.

The United States Supreme Court has repeatedly held that in the regulation of rates the common carrier is entitled to earn a return upon the value of the property employed by it in the public service, and is not limited to the original cost thereof or the amount the carrier has invested therein. The Interstate Commerce Commission in its first annual report and frequently since has recommended that steps should be taken to ascertain the value of the railroads; such information being deemed essential:

To obtain a trustworthy estimate of the relation existing between the present worth of railroad property and its cost to its proprietors;

In determining whether rates as fixed by the government are confiscatory;

In connection with railway taxation;

In the ascertainment of a proper depreciation reserve;

In testing the accuracy of the balance sheets of the carriers;

To the organization of railway statistics in general;

In determining whether the railroads are under or over-capitalized.

In 1910 Congress had under consideration a bill to regulate the issuance of securities of railroad companies, but instead of taking action authorized the appointment of a commission to study and report with reference thereto. The commission, headed by President Arthur T. Hadley of Yale University, advised in its report submitted in 1911 against such legislation pending a valuation of the property used in interstate commerce; the report was probably most influential in causing the passage of the Valuation Act approved March 1, 1913.

The act as passed was very different from and was a development of a bill providing for the valuation of the physical property of the railroad companies. As such it was known as a bill "providing for physical valuation," and passed the House of Representatives in that form, but underwent a radical change in the hands of the Senate sub-committee, providing as reported, for the ascertainment of the value of all of the property of a carrier, includ-

*This paper appeared in *The Annals* of the American Academy of Political and Social Science, Vol. LXIII, January, 1916, on "National Industries and the Federal Government."

ing what was specifically designated in the act as "other values and elements of value," thus specifically providing for the value of the railroad as a going concern, as distinguished from a mere appraisal of the physical elements composing it.

It was generally believed at the time of the passage of the act that the work involved constituted the greatest economic study ever undertaken, but even those most interested and best informed under-estimated the cost and the time necessary for the work. The Congress which passed the act was informed that the work would be done in from three to five years at a cost of six to ten millions of dollars. The recital of what has since occurred will clearly demonstrate the inaccuracy of these estimates, and the indications two and one-half years after the passage of the act are that the work will cost the government and the railroads somewhere near fifty millions of dollars and will take at least ten years.

Most legislation regulatory of corporations requires reports by the corporations to the governing body. One of the most important features of the Valuation Act requires the carriers to "co-operate with and aid the Commission in the work of valuation," in addition to furnishing maps, contracts, reports, etc.

In order that this co-operation may be rendered in the most systematic and helpful manner, the railroad companies selected a committee of eighteen railroad presidents to represent them in this work. That committee at the request of the Commission has from time to time appointed engineering, land, and accounting committees to consider with the Division of Valuation the principles and innumerable details connected with the work. The Commission was fortunate in having one of its members willing to devote his entire time to the work, in consequence of which Mr. C. A. Prouty resigned from the Commission and was appointed Director of Valuation. Upon his recommendation the Commission divided the United States into five districts, and has created administrative boards of engineers, land attorneys, and accountants of five members, one member for each district. The Commission also appointed an advisory board to act in a supervisory capacity and aid in the solution of the more important questions.

A solicitor was likewise designated to supervise the legal work of the government, and the railroad companies have created a committee of counsel. The legal features of the work are of great

importance; the amount of detail and the expenses involved require that care should be taken to see that it is done in conformity with the requirements of the act.

Notwithstanding the realization by the representatives of the government and the railroad companies that a valuation could not be made until a decision had been reached upon the many important principles involved, it was decided to proceed with the onerous task of inventorying in detail as required by the act, all of the property, as it was felt that in solving the problems arising in connection therewith, the experience thus obtained would be a valuable aid in reaching a correct decision upon the principles involved.

The method of inventorying was considered by the Engineering Board of the government, which held a number of conferences with the engineering committee representing the carriers. The carriers offered to make and submit inventories of their properties, but the government representatives concluded that they would prefer maps showing the lands of the carriers and the improvements thereon, and to make their own measurements. While agreeing that the maps of the lands should be furnished, the carriers urged and still feel that an inventory furnished by them of their improvements would be far more serviceable than any map, which could not be more than a picture of their improvements. The government has since partially recognized this contention by an order empowering the Director of Valuation to require the carriers to furnish an inventory of their improvements in terminals and other congested districts. Notwithstanding this fundamental difference of view as to procedure the carriers are successfully aiding the government in its work. The field parties of the government are accompanied by a representative of the carrier who points out the property and assists in the correct ascertainment of the quantities by furnishing the government with detailed plans of structures, and by the production of records where they exist. This is essential where the ascertainment of the amount of work done is not readily observable from the surface conditions, as in the case of foundations extending far below the present surface of the ground, and where the amount of work in graduation is difficult to determine by reason of the change in surface conditions in adjacent territory.

The Commission wisely proceeded experimentally with a few field parties until such a time as experience had demonstrated the nature of the best organization thereof, and the number that could

be properly supervised by such a headquarters organization as could well be created. At the present time the government is surveying about 4,000 miles of road a month, the number of miles varying in different sections of the country depending upon whether it is thickly settled or otherwise and whether of a flat or mountainous nature, the number of tracks and the quantities and character of the railroad under inspection.

As the Commission had only \$500,000 at its disposal from March 1, 1913, to June 30, 1914, it was not in a position to do a large amount of field work. For the year ending June 30, 1915, it had \$2,300,000. Now, however, it is estimated that with the continuation of the present appropriation of \$3,000,000 per annum it will be able in four years from January 1, 1916, to survey most of the 250,000 miles of railroad in the United States. As the government has not undertaken, however, any work upon the trunk line railroads with two, three or four tracks, I do not believe the government will be able to complete the work within that time.

Experience has shown that the greatest progress is made where the carrier prepares for the work by a year's investigation prior to the commencing of field work by the government forces. The Director of Valuation has, therefore, prepared a tentative program so that the carriers may know when to expect the government to commence the work on their roads. It is not only helpful to the government, but partially avoids the creation and maintenance of an unnecessary organization upon the part of the railroad company prior to the time when it should commence work of preparation for the government.

The selection and education of the railroad representatives generally known as pilot engineers is one of the most important features of the work. These men should have sufficient time at their disposal, before beginning of work by the government forces, to become thoroughly familiar with both the records and the physical property of the portions of the railway which are assigned to them.

The government and the railroads early recognized that in order to avoid endless disputes upon many of the details it would be important to agree upon the facts while the inventory is being made. It was therefore arranged that where a carrier co-operated by sending its representative along with the government field parties that the carrier should receive a copy of the notes taken by the government field parties, and that these notes should be checked by

the carrier and any exception taken thereto within a limited period of time. No arrangement has so far been made for the settlement of disputes or where the exception is taken by the carrier if the government notes do not record all of the facts. It is, however, expected that provision therefor will be made in the near future.

After the calculation and assembling of quantities comes the application of prices in order to make an inventory. It is contended that there ought not to be differences that cannot be adjusted with reference to quantities, but it is conceded that the determination of prices offers the opportunity for wide differences of opinion. The prices of labor and material vary in different parts of the United States, and vary from time to time. The lowest prices usually occur in periods of business depression during which there is little railroad construction. The prices of some materials have a tendency steadily upward and a few have uniformly decreased, and others widely fluctuate, but it is believed that a study of records over a sufficient period of time will disclose (except where there is a pronounced tendency in one direction) an average price prevailing during a period of five or ten years, which, when modified by the trend, will indicate what prices should be fairly applied for materials. The amount to be allowed for labor is, however, more difficult. That proposition may be most easily illustrated by the statement that from fifty cents to one dollar more per day is paid in some classes of construction work than for similarly described occupations in the more steady and less exacting railroad maintenance work. This is partially explained by the permanency of employment in connection with maintenance work as distinguished from the temporary character and somewhat more hazardous and hard nature of construction work.

The Valuation Act requires that the Commission shall ascertain and report to Congress the original cost, the cost of reproduction new, and the cost of reproduction less depreciation. The Commission has found that the records of many carriers are very meager or have been destroyed by fire or lost in consolidations, and that it is therefore impossible to so comply, as to original cost, with the act in the case of those carriers, and that the cost of doing so in the case of the others is almost prohibitive. One original estimate of the cost of valuing the railroads was as low as \$10 per mile. In one case the Commission expended \$110 a mile in investigating the original cost of a railroad constructed within the last twenty years.

The determination of correct principles, which is so important from an economic standpoint, is perhaps best illustrated by the difficulty in valuing the land and the treatment of the question of depreciation. Substantial differences of opinion now exist between the government and the carriers on these subjects, and it may prove to be unfortunate that the act seemingly makes no provision for the testing in the courts of the legal principles involved, until after a valuation has been completed. The Valuation Act is specific in its requirements as to what the Commission shall ascertain and report as to what the railroad companies paid to acquire their lands and as to the methods employed by the Commission in determining the present value thereof. It contains no detailed directions, however, with reference to depreciation. The necessity, which was so long ago recognized, of economical transportation facilities caused all state legislatures to provide for a means of acquisition by railroad companies of property and property rights in order that railroads might be constructed upon proper alignment and reasonable grades. The rights of way owned by the railroad companies were thus acquired where the owner and the representatives of the railroad company could not agree as to the value of the property taken. Recognizing that the benefit to the community of a railroad by the most direct available route might deprive property owners of something more than the mere proportionate part represented by the area of the part taken of the value of his property as a whole, the legislatures and the courts have invariably held that the owner should be paid the difference between the value of his property before and after the taking of the part of his property by the railroad company. The railroad company thus acquired not merely a parcel of land, but property rights, the value of which must now be ascertained in finding the value of the property as a whole. The difficulty of determining these property values is generally recognized, and is fully dealt with in the brief recently filed by the railroad companies with the Interstate Commerce Commission.

The difficulty in connection with depreciation is largely caused by the failure to distinguish between deterioration and depreciation as commonly understood. Deterioration is a change from a condition of newness. Such a change is bound to occur, and in large and complex properties like a railroad which takes several years to complete, so that many of the minor items, such as ties, entering into its construction even at the time the property is first put into

operation, are not absolutely new. In a railway maintained in the best possible condition, all of its parts cannot be new at any one time. To call this change depreciation and deduct from the cost of putting the part in place is to immediately declare that the value of the investment is less than the cost necessary to create the property.

Parts of a complex property like a railroad do not all wear out at once, and so long as they are replaced from time to time when replacement is due, the property as a whole has not depreciated. This is strikingly true of a roadbed which has a greater value when properly maintained after years of use than it had when first constructed. In order to operate trains over the railroad with safety and speed, the roadbed must become settled, which takes several years; the ballast and ties and rails in the track must become adjusted by work which can only be done as time, labor and the action of the trains and the elements bring about the solidified condition of the roadbed. Time also demonstrates that changes are desirable that are not due to mere maintenance. Some parts of the property become inadequate or obsolete, and while possessing structural strength to perform the work for which they were designed, it is not longer desirable to keep them in service from an economic standpoint. For this reason even in the best and most properly maintained railroad properties, renewal funds have of late years sometimes been created where earnings would permit of the setting aside of a sum therefor. The creation of such a fund, however, should not be taken as depreciation in the property as it exists. Unless public policy would permit the creation of such a fund, or the earning of a rate sufficient to care for such expenditures, the replacements would have to be wholly paid for by the issuance of new capital. To so provide for the cost would be unwise because it would be uneconomical and would build up a disproportionate capitalization. The development of our transportation machine has been so rapid in recent years that statistics, unless very carefully analyzed, are misleading, for there has not been a proper distinction in accounting between expenditures which are for the replacement of parts in the maintenance and the replacement by the more efficient instrument. It is important in this connection to keep in mind the past practice of the carrier with respect to the creation of the renewal fund where any has been created and the future policy of the regulating body with reference thereto.

But few railroad properties exist today in the form in which they were originally constructed. The business of the past did not justify such vast expenditures as are now made, but there is frequently the question as to whether the most economical way of producing the property in its present condition would not involve, even at the present time, the construction of at least some of the property which is not now in service, and which is designated as abandoned property. The consideration of such expenditures is one of the problems of the Commission in determining present cost of the reproduction of the property.

The Interstate Commerce Commission had up to September 15 last served upon the carriers twenty orders in connection with the valuation work. While the time allowed to comply therewith is less in the judgment of the railroad representatives than is reasonably necessary, the effort in all cases is being made to comply. They provide for maps and profiles, inventory of stock materials and supplies, for schedules of land and equipment and the original cost thereof, and for a great number of schedules of prices paid by the carriers for materials and labor. Other orders call for information relating to abandoned property, and for information as to ownership of industrial side tracks not located on the right of way or station grounds of the railroad companies; for reports as to aids, gifts, grants and donations, and for the preparation of a corporate history to be illustrated by a chart and accompanied by a descriptive statement. For convenience of reference, but not deemed of any importance in determining value, the carriers are required to make reports as to portions of the property that they have leased, and inventory their minute books and accounting and other records. In order to keep the inventory when made up to date, provision is made for keeping a record of additions and betterments and extensions, also deletions. Such a correction of the inventory, however, will not disclose the value of the property, as its condition, earnings and other factors are vital elements at any time in determining the value.

As there is much earnest discussion and doubt as to whether the valuation work when completed will serve any useful purpose, I express the opinion that when the work is completed the results will convince the public that the railroad properties in the United States are worth much more than their present capitalization.

DEPRECIATION AND APPRECIATION OF RAILWAY PROPERTY*

BY W. H. FORSE, JR., C. P. A.

A certain man started in the business of making automobiles. He acquired patents for a small amount of money, purchased land on the outskirts of the city, erected buildings, installed machinery, and was soon making and shipping a great many motor cars.

He was deeply interested in mechanical details, but cared nothing for figures, other than to know his plant was making plenty of money, but one day he called upon his bookkeeper for a quantity of statistical information, as he contemplated selling out his business. When the figures were submitted he was amazed at the low valuation shown in the balance sheet. The patents, upon which an enormously profitable business had been built up, were carried at the original cost, before manufacturing had made them valuable. The land, once purchased for a song, was now in the heart of a thickly-settled community which had been built up around the automobile factory. The bookkeeper had valued this land, in the accounts, at the original cost, which was about that of farm acreage. Ignoring these appreciations in value, the bookkeeper had written down from year to year, estimated depreciation on the original cost of line shafting, pulleys and drive belts, until these items were almost wiped out of existence on the books, although the factory was filled with machines driven by shafting, pulleys and belts, most of which had been paid for out of earnings. Depreciation had not been charged against any other parts of the plant and equipment.

Patient questioning drew forth the information that the bookkeeper had, in his early business life, worked in a research office where he had absorbed what he thought were the fundamental principles of accounting. He had been instructed that exclusive franchises were to be valued at cost only, and he had therefore valued the patent rights, also a monopoly, in the same manner. Several men had, in his presence, stated that a railroad or other public service corporation, was not entitled to place any value or earn any divi-

*Paper read before the Central Electric Railway Accountants' Association at Detroit, Dec. 7, 1915.

dends, upon the increase in worth of land used for right of way, terminals, station buildings, or other purposes, hence he had steadfastly adhered to this idea in valuing the factory real estate as farm acreage. The amusing side of the discussion was his reference to depreciation. His early experience had emphasized the importance of providing in his accounts for depreciation on rolling stock. The drive belts, pulleys and shafting were, in his estimation, the equipment that "kept the factory rolling," and he had charged off depreciation on these items alone.

Puzzled, the automobile manufacturer asked his scribe why in the name of common sense he had adopted for the automobile business a system of accounting used by railways, which were servants of the public. The bookkeeper replied that he could not see so very much difference between the two classes of business. Automobiles were used by the public as a means of conveyance; they ran swiftly along the highways from village to village, and in many cities competed with the street cars for riders at five cents, sometimes called a "jitney," a ride. Automobile operators were not restricted by franchise regulations in very many places, it was true, but neither were they annoyed by having to pay for street paving, sewers and sidewalks which the street railway companies buy so frequently.

Despairing of arriving at any correct solution through his own bookkeeper the manufacturer finally sent for an expert accountant who added some large round sums for estimated appreciation in value of the patents and real estate, besides a generous figure for a surprising thing called "going value," the result being that the plant was turned over to its new owners at a price which was eminently satisfactory to themselves and the seller. History recordeth not what became of the scribe.

This imaginary tale is used for the purpose of illustrating a few truths and opinions concerning the subject of Depreciation and Appreciation of Railway Property. Volumes have been written, weighty discussions have taken place, and many theories have been advanced, yet is it not an admitted fact that depreciation is usually an unknown quantity and is not the same for any two establishments, even for the same industry? I do not hesitate to state that it is impossible to frame concise general rules for making allowances for depreciation which will not, in their application, be attended with a large margin of possible error.

Electric railways engaged in interstate commerce are required, by the Interstate Commerce Commission, to include in operating expenses "uniform monthly charges representing the depreciation of equipment." The term Equipment, as used in this connection, is confined to rolling stock (and floating equipment). The order became effective July 1, 1914, and the subject will be discussed in the light of one year's experience with the new system of accounting.

The writer, through correspondence with a number of electric railway accountants, has gathered some experience data which is submitted to show the wide diversity of opinion of men who are in actual and direct contact with the operation of electric railways. The names of the companies are not given, but the majority of them are electric railways reporting to the Interstate Commerce Commission, and the percentages are the rates used for the year ending June 30, 1915, the first year under the new plan. The amounts are charged to operating expenses and concurrently credited to a balance-sheet account entitled "Accrued Depreciation—Road and Equipment," under the Interstate Commerce Commission system of accounting.

ANNUAL CHARGES FOR ROLLING STOCK DEPRECIATION.

Road No.

- 1—An arbitrary charge of \$1,200 per year.
- 2—4% of original cost less estimated value of salvage.
- 3—6 cents per car mile for maintenance and depreciation.
- 4—3% of the original value.
- 5—5% of the valuation of equipment.
- 6—An arbitrary charge of \$3,600 per year.
- 7—3% of record book value.
- 8—One twenty-fifth of 75% of original cost. (25 year life; 25% salvage.)
- 9—Arbitrary deduction from income; \$500,000 per year for several years.
- 10—1% of appraised value.
- 11—2% of value.
- 12—3% of cost of equipment.
- 13—1% of gross value.
- 14—An arbitrary charge of \$2,400 per year.
- 15—One twenty-fifth of 75% of original cost.
- 16—5% of value.
- 17—2% of estimated value.

- 18—4% of estimated cost less 25% salvage.
- 19—2½% of present value.
- 20—Arbitrary charge of \$12,000 per year.
- 21—2% of book value.
- 22—2½% of inventory value.
- 23—An arbitrary charge of \$1,000 per year.
- 24—5% of appraised value.
- 25—6% of gross income.
- 26—6% of gross earnings for maintenance and depreciation.
- 27—Arbitrary charge of 4.3% of investment.
- 28—5% of appraised value less estimated salvage.
- 29—10% of value.
- 30—5% of estimated value.
- 31—2% of book cost including betterments.

Another large electric railway has been charging off depreciation for several years at the rates and on the bases shown in the following table:

CLASS	Life in Years	Estimated Salvage Percent.	Deprecia- tion Percent.	Annual Rate Percent.
Power Plant Equipment	20	10	90	4½
Substation Equipment	20	10	90	4½
Passenger & Combination Cars:				
Steel	32	20	80	2½
Wooden	21¼	15	85	4
Freight, Express and Mail Cars:				
Steel	32	20	80	2½
Wooden	20	20	80	4
Electric Locomotives	32	20	80	2½
Service Cars:				
Steel	32	20	80	2½
Wooden	16	20	80	5
Electric Equipment of Cars	12	10	90	7½
Electric Equipment of Locomotives	15	10	90	6

The chief accounting officer of the Company using this table writes:

"In this connection I might say that some peculiar results are occasionally produced; for example, we have practically written off the value of certain pieces of machinery, but so far as we can tell now they are worth fully as much as when they were installed. In my opinion the basis generally employed for this purpose is a wild estimate or a prejudiced guess."

It is apparent from a study of the foregoing tables, that electric railway accountants have grappled with the problem and made a sincere effort to comply with the requirements of the Commission. It is likewise apparent that there is an honest difference of opinion regarding the life of rolling stock. The figures as they stand represent an expectation of life ranging from ten years to one hundred years.

The data compiled by a committee of the American Electric Railway Accountants' Association, show estimates of ten years to fifty-nine years as the probable life of rolling stock.

Before proceeding to search for the cause of this apparent conflict of opinion, two examples will be cited of old electric railway cars in actual service. Some of the figures used by steam railway operators and accountants in estimating depreciation of equipment will also be shown.

In Boston, about 100 small twenty-foot motor cars, twenty years old, have recently been rebuilt with modern centers and these new "articulated" cars were found to be better than new cars of other types because they were especially fitted for the narrow streets and short turns in that city. The cars were considered almost worthless until this conversion of type was decided upon.

Included in the serviceable rolling stock of a large eastern railway are twenty-two cars which were built about twenty years ago in Troy, New York. Most of them are ten-bench cars. The maintenance requirements of these cars are light. A yearly overhauling is given, and painting, varnishing and minor renewals of flooring, panels or other parts subject to wear or shocks from without fairly complete the work which has to be done on these bodies. On one open car body the platform has never had to be repaired since the first day of service. The cars are in first-class operating condition and in almost daily use. (Report dated August, 1914.)

At a hearing in 1914 before the Interstate Commerce Commission, J. T. Wallis, General Superintendent of Motive Power of the Pennsylvania Railroad, testified as follows:

"At the present time the Pennsylvania Railroad Company charges depreciation on the following basis: locomotives and passenger cars on a basis of 4 per cent of the original cost of the equipment, and on freight cars on a basis of 3 per cent. on such cost, for the reason that we believe a locomotive will last about twenty years, and based on the final value of the scrap being 20 per cent. of the original value, the depreciation plus the salvage will equal the original cost. On passenger cars we believe that our wooden cars will last twenty years. As far as steel cars are concerned, we do not know how long they will last, but in order to provide for the replacing of our wooden with steel cars in a reasonable time, and for the steel cars when they shall have to be retired, the best figure we have been able to arrive at is 4 per cent."

The Boston & Maine Railroad Company (see Wall Street Journal, April, 1914) has charged off practically 4% per annum from cost, or book value, of its rolling stock during the past ten years. The New York Central lines charge off 2% per annum and the

New Haven comparatively recently inaugurated a regular charge of the same amount. Two of the large Western railway systems have included depreciation at the rate of one-fourth of 1% per annum in reporting to the Commission.

The compilation by the Interstate Commerce Commission of the answers of carriers (steam railways) owning in the aggregate approximately one billion dollars worth of equipment shows the percentages charged to depreciation to be as follows, during the years 1908 to 1913. (Extract from the Five Per Cent. Case No. 5860 before the Interstate Commerce Commission):

1908—2.53	per cent. of cost or record value.
1909—2.34	per cent. of cost or record value.
1910—2.55	per cent. of cost or record value.
1911—2.25	per cent. of cost or record value.
1912—2.47	per cent. of cost or record value.
1913—2.79	per cent. of cost or record value.

In discussing the subject of depreciation the author of this paper will not do any hair-splitting regarding the technicalities of methods employed. Why fill pages of perfectly good white paper expounding the straight-line method or the sinking fund method of calculating depreciation, when the basis of all the discussion might appropriately be represented by the algebraic symbol X —an unknown quantity. Let us make an effort to solve the big question instead of drawing elaborate curves or preparing intricate mathematical formulae which mean nothing.

In studying the subject it is interesting to note some of the opinions expressed by men who approach it from different angles, each throwing light upon some particular phase of the problem.

Halbert P. Gillette in his Handbook of Cost Data gives a formula for estimating depreciation which he calls the "unit cost depreciation formula." He bases his formula on the following assumption:

The owner of a second hand machine is entitled to such a price for it as will enable the purchaser to go on with its use and produce each unit of product at as low a cost as the average unit cost of production would be during the entire life of the machine.

Whitten says:

"Depreciation may be considered from the viewpoint of the advantage to the user of a hypothetical substitution of a new article for one that is partly worn. It may be summed up in the question, how much could the user afford to pay to have his worn article replaced by a new one? How much could the company afford to pay to have a five year old car replaced by a new car of exactly the same kind?" (Valuation of Public Service Corporations by Robert H. Whitten, N. Y., 1913.)

Judge Clark, member of the Indiana Public Service Commission, in an address entitled "The Depreciation Account," made at Terre Haute recently, said:

"There is much force in the claim that so long as a plant renders efficient service the return should be on the basis of a plant new. I recall a utility plant in this State which has never been able to carry a depreciation fund. Its plant is in fifty per cent. condition and by the prevailing customs in rate making cases the return allowed must be on half the value of a new plant. When I say fifty per cent. condition I mean that half the life of the plant is gone. Yet the plant is furnishing first-class service and so far as the patron is concerned it is one hundred per cent. efficient. In such a case the patron should pay a rate as high as he would have to pay on a new plant."

The Supreme Court of the State of Idaho in the case of *Murray v. Public Utilities Commission of Idaho* handed down a decision recently (July 1, 1915) containing the following sentence:

"In other words, if it be demonstrated that the plant is in good operating condition, and giving as good service as a new plant, then the question of depreciation may be entirely disregarded."

The Public Service Commission of New Hampshire rendered a decision (1914) in the Manchester (N. H.) Street Railway fare case in which the opinion was expressed that "justice to the company and to the public good alike requires that the deficiency in the present depreciated value of the property below the amount actually invested by the stockholders be regarded as a cost of developing the business and as such added to the depreciated value to determine the present fair value of the property devoted to the public service."

In the work entitled "Valuation of Public Utility Properties," by Henry Floy (New York, 1912) the statement is made:

"Consider two surface railways running out parallel avenues from the center of a city to the suburbs, both alike in construction, but one 10 years old and the other put in operation within a year. If theoretical depreciation is considered the present values of these two properties are quite different, the older road being worth appreciably less than the new road, although the original cost of installation may have been the same in both cases. Under such circumstances, is the older road to be allowed to charge only a four cent fare, assuming that that gives a fair return on the estimated present value, while the new road must charge a five cent fare for the same return on its estimated value? What would be the result practically of such method of fixing rates? The old road would be swamped with business and the new road would be unable to maintain its earnings."

It is an established fact that a railway system cannot be kept in an absolutely new condition. It may be maintained at 100% efficiency, yet during the early years of its life the maintenance cost will

vary considerably until it finally settles down to a practically constant percentage of wear and of depreciation and a practically constant expenditure for repairs and renewals. This brings us to a consideration of the subject of renewals and its relation to maintenance and depreciation. Railway rolling stock, especially, is renewed and rebuilt until of its original component parts there sometimes remains scarcely a trace. One railway system, with which the writer is familiar, expends in nine years for repairs and renewals of rolling stock a sum equivalent to the total original cost of the equipment. It is quite possible, in this manner, to take care of depreciation through the maintenance and renewal of principal parts and the replacement of units in service. This method has been used very satisfactorily by some steam railways for years. Certainly the question of depreciation can not properly be discussed without careful consideration of the items of renewals and replacement. In actual practice the use of depreciation accounts may be entirely unnecessary when renewals of principal parts and replacement of units in service have been adequately taken care of through maintenance (Operating Expense) accounts.

Courts and commissions differ in their interpretation of depreciation and renewals to such an extent that the earnest seeker for information becomes more and more bewildered as he reads conflicting opinions, theoretical treatises and technical discussions.

The Public Service Commission of Montana (1914) understands the depreciation expense account to cover "All expenditures for ordinary repairs, renewals or replacements resulting through wear and tear and incidental casualties, such expenditures being necessary to keep the productive capacity of the plant to its original state of efficiency."

The Board of Public Utility Commissioners of New Jersey and the Public Service Commission of Maryland deduct the amounts charged to the maintenance accounts for repairs from the amount estimated to cover the wear and tear, obsolescence and inadequacy for the period and credit only this difference to the depreciation reserve.

The Public Service Commission of the First District of New York requires that each month the sum of the amounts charged for that month to repair accounts shall be compared with the amount estimated to be necessary to cover such wear and tear and obsolescence and inadequacy as have accrued during the month on all

equipment, and the estimated difference shall be charged or credited to the account Depreciation of Equipment under operating expenses.

The Interstate Commerce Commission has published a decision (Accounting Bulletin No. 9, Case 296) in which the statement is made that "no charge shall be made against the reserve for accrued depreciation for repairs of equipment unless the equipment is converted from one class to another."

In the Queens Borough Gas and Electric Company (P. S. C. 1st D. (N. Y.)—decided June 23, 1911:

"Experience has shown that the straight line method for depreciation produces a larger fund than is necessary. Firstly, some portion of the annual loss is made good by renewals and replacements regularly included in maintenance and already allowed in operating expenses. There are difficulties, however, in ascertaining the precise amount of depreciation thus made good by maintenance."

In a case involving an accounting order issued subsequent to the approval of an issue of securities after re-organization, by the New York Public Service Commission for the First District (Third Avenue Railway Company, February 3, 1912) the Commission ordered the company to reserve at "least 20% of its operating revenues" for maintenance and depreciation.

Halford Erickson, member of the Railroad Commission of Wisconsin, said in an address delivered September 25, 1912, before the Convention of Central Water Works Association, Detroit, Mich.:

"Larger corporations, such as railways with thousands of miles of lines, and such as industrial enterprises with many plants, often appear to get along very well with repair or maintenance accounts alone. Their business is so extensive that renewals as they occur can be charged to repairs without seriously disturbing their net earnings. Owing to the very extent of their property, their renewal requirements are likely to be fairly regular from year to year."

A discussion of depreciation leads inevitably to a discussion of valuation, just as a discussion of depreciation is incomplete without some reference to its twin, appreciation.

In the case of Savannah & Suburban Street Railway Improvement Association v. Savannah Electric Company, decided January 5, 1912, by the Georgia Railroad Commission, the application for a reduction in rates was denied. In regard to the annual allowance for depreciation, the Commission says:

"The commission is of the opinion that an annual allowance of three per cent of the total valuation of the physical properties of an electrically operated city and suburban street railway system, for depreciation and obsolescence, is fair and reasonable, and this percentage we have allowed."

In this case the court holds that an allowance for depreciation and obsolescence is fair and reasonable when rate-making and return on valuation are under consideration. The general principle involved in this case is the same as expressed in the opinion of Public Utilities Commissioner Ramstedt, Idaho, in the Pocatello Water Case, 1915: "A person having embarked on a continuous business enterprise for the benefit of others is justly entitled to compensation to cover physical depreciation, in addition to a fair return, over and above expenses, upon the reasonable value of the property which he has employed for public use."

We do not disagree with these fundamental principles, but we do object to the methods sometimes employed, such as prescribing the use of depreciation accounts, chargeable as operating expenses, for certain classes of property, without at the same time taking into consideration the appreciation in property values and the "present worth" or the surplus of assets over liabilities.

For example, in the case of a railway (Chas. E. Otis, Special Master in Chancery, Minnesota Rate Case, 1910) "it is established that the roadbed is constantly increasing in value. It becomes solidified, embankments and slopes of excavation become settled and stable and so they better resist the effects of rain and frost. It becomes adjusted to surface drainage and the adjustment is made permanent by concrete structures and rip-rap, and in other ways a roadbed long in use is far more valuable than one newly constructed," and again—

"How railway operatives and engineers regard the matter is illustrated by the fact that, the Chicago, Milwaukee & St. Paul began running through freight trains over its Pacific Coast Extension in July, 1909, but would not let even the large prospective travel to the Alaska-Yukon-Pacific Exposition at Seattle tempt it to begin running through passenger trains over the extension until April, 1911, almost two years after the opening of the line for freight service. The physical plant of a railway which is ten years old or more and has been properly maintained is a better transportation machine than the plant of one that has just been finished." (Valuation of Railways, Dunn.)

In considering the appreciation in value of lands, right of way and terminals, "let us imagine that, inspired by a mistaken policy toward existing private railways, the government of the United States were to attempt to parallel the New York Central lines from

New York Times Square to Van Buren and Clark Streets, Chicago. Can there be any doubt that it would have to pay a 'railway value' for the property acquired by negotiation or condemnation, not only for its terminals in New York but through all the cities, towns, hamlets and farms for over 900 miles? It is within reason to estimate that one mile alone of right of way to the heart of New York would cost between \$50,000,000 and \$100,000,000." (Slason Thompson, Chicago, 1912.)

An examination and revision of the property accounts of one of the large eastern railway systems was recently finished by a firm of well-known certified public accountants assisted by a consulting engineer of national reputation, and his staff of assistants. The work was extended over a period of three years and when completed showed a surplus arising from appreciation in the value of property investment, as determined by appraisal, of over one hundred and fifteen million dollars. This investigation has absolutely proved that one railroad is under capitalized and strengthens the belief in others.

* * * * *

"A large railway system in the hands of receivers recently defaulted the interest on its underlying bonds, small issues whose protected position had made them absolutely secure in the eyes of investors. Upon the appearance of the annual report it developed that the amount required to pay this interest had been applied by the receivers, under direction of the court, to the depreciation charges. Including a similar accounting requirement in connection with abandoned property, the Interstate Commerce Commission had put two million dollars into expenses, and brought up the operating ratio to 106%, the resources so represented being diverted from the physical property instead of put into it, in so far as the unit system of reserves could accomplish this result. This is a somewhat onerous impost for a company in struggle to rehabilitate itself for reorganization."

"Another of the larger systems proposed some time ago to readjust its finances. It had had no mortgage bonds or other salable securities upon which to raise money and, for this reason its traffic facilities had become inadequate and outgrown and, in the endeavor to keep up its service, it had accumulated a large floating debt. In order to have a sound basis of fact upon which the readjusted corporation could ask of investors the new cash needed in rehabilitation, chartered public accountants were called in to verify, and

restate, the books of account. This is the necessary procedure in reorganization. But the accountants insisted that the books of a reorganized company should write off at the outset the past depreciation on equipment which the regulations require living companies to write off gradually. The amount of the accrued depreciation was of sufficient magnitude to convert the corporate surplus into a heavy deficit. As there is no way of creating securities against a deficit, naturally the financial readjustment became impossible." (Morrell W. Gaines, N. Y., June 4, 1915.)

The depreciation accounting requirements for steam railways became effective July 1, 1907, and there have been several changes and modifications in the orders during the years that have elapsed since that time. None of these orders correct the retroactive and inequitable operation of the plan. We refer to the regulations which formally required the railroads to charge, gradually, to profit and loss surplus, all of the depreciation on rolling stock which had accrued prior to 1907, while no allowance is made for appreciation in the value of other property of the railway. Assuming, for example, that the railway equipment had cost three billion dollars, and its average age in 1907 was 35% of its total average life, there will be arbitrary charges in the years following 1907, for depreciation prior to 1907, of more than one billion dollars to be absorbed through the Surplus Account without compensatory offsets. The earnings may have been large and the holders of stock prior to 1907 may have received this billion dollars in dividends, justifying the assumption that the railways as money-earners had proved their worth and the appreciation in value of their right of way, terminals and other property. Under the Interstate Commerce Commission plan of accounting this billion dollars is charged against the stockholder of the present and his dividends are curtailed while tedious governmental valuations and theoretical accounting system postpone and obscure the true reckoning of values and earnings.

The plan of accounting for depreciation of railway property, as required by the Interstate Commerce Commission is, in the writer's opinion, neither scientific nor practical in its application and operation. A railway which cost one hundred million dollars to build and equip may own rolling stock which cost ten million dollars. Is it consistent to select one item of this great transportation machine, and write down its value month by month on a mere guess, while the remaining ninety million dollars of investment, much of it having

enormously increased in value, is left undisturbed? Is it a good plan to inject so much of theory and estimate into the accounts of railways?

There was a Conference on Valuation in Philadelphia, November 10 to 12, 1915, under the auspices of the Utilities Bureau. Economists, educators, engineers and public officials expressed widely divergent opinions regarding some of the theories underlying valuations. Milo R. Maltbie, member of the Advisory Board, Division of Valuation, Interstate Commerce Commission, advocated the inclusion of appreciation of land values as an item of income, to be credited as such, on the same theory that depreciation is allowed as a charge to operating expenses (*Electric Railway Journal*, November 13, 1915).

The inclusion of appreciation of land values, as current income, month by month, would be as impracticable and as hard to calculate as the wasting of property (depreciation of rolling stock) month by month. Why should either of them be included in the Income Account? Would it not be much more sensible to take care of such estimated fluctuations through the Surplus Account? Assuming, for example, that the book valuation of the various units making up the railway property has not been increased by the estimated appreciation in value of portions of the property, such as right of way, road-bed, terminals, etc., and a book surplus has accumulated, is it not permissible to say that this ability to accumulate a surplus through the operation of the property proves the value of the property as a transportation machine? The existence of a comparatively adequate surplus generally warrants the assumption that replacement of worn-out physical property can be made as and when required by actual depreciation. A surplus may be built up as insurance against financial panic, disastrous floods and fires, and other exigencies as well as for assurance of the replacement of physical property at the termination of useful life. It is not reasonable or fair to assume that a corporation has not provided for depreciation merely because the balance sheet does not contain a separately-tagged depreciation—or replacement—reserve account. Its real surplus may, as a matter of fact, be adequate to take care of many other contingencies besides the wasting of assets or so-called physical depreciation. A careful examination and analysis of the balance-sheet is more important and will be more fruitful of results than mere theorizing regarding the depreciation of a portion of the physical property. Arbitrary regulations

of the income account should not in justice be substituted for first-hand knowledge of property and earning values. In order to avoid the monthly arbitrary changes in operating expenses and net earnings, which are unavoidable under the Commission plan of accounting, the Surplus Account should be used to reflect fluctuations in net worth when all the facts are known. If this were done, the use of the depreciation accounts required of railways under the plan now compulsory would be almost wholly unnecessary.

REGULATION OF RAILROAD FINANCE AND ORGANIZATION*

By W. M. ACWORTH in *The Economic Journal*.

On the publisher's wrapper of this second volume of Professor Ripley's comprehensive review of railway problems I am reminded of what I said in the *Economic Journal* on the occasion of the appearance of the first volume two years ago. "In the English language there exists no such complete presentation of the whole subject from the pen of so competent an author." The same high praise may be given without hesitation to the volume now before us, though it is right to notice that this new volume, as is only natural from its subject, possesses less interest for the catholic economist outside the United States than the former. Theory and general considerations have more bearing on rates and regulation than on finance and organization, which must be chiefly controlled by the special market and business conditions of each particular country. While, therefore, the new volume will be read everywhere by students of railway questions with the utmost interest, it can hardly be expected to command outside America as wide an audience as the previous one. The railway financial history of the United States covers now nearly three generations and extends over two-thirds of a continent. To compress it all, from the time when the capital of the Camden and Amboy was raised in England in the early 'thirties down to the New Haven *débâcle* of the other day, within the compass of a single volume it is necessary to cut very short each individual tale. And it is questionable whether the reader, coming to the subject with no previous detailed knowledge, will in every case be able to grasp, from Professor Ripley's necessarily abridged summary, what it is all about. There is a further disadvantage. When space is thus limited and summaries are thus abridged, selection, not only of the cases to be included, but of the salient points in those which are included, largely depends upon the personal equation of the selector.

And this is an important matter. In reviewing the previous volume I said that I had only "one serious criticism," that Professor

*Being a review of Prof. William Z. Ripley's "Railroads, Finance and Organization," in *THE ECONOMIC JOURNAL* for September, 1915.

Ripley's doubt, whether there was in it "bias" and "lack of judicial poise," must in my judgment be decided against him. In the present volume I seem to see a certain change of mental attitude. Credit is given to the railroads in terms that are often generous. For instance, on p. 51, winding up fifty pages of what is rightly described as "rather depressing comment" upon American construction methods, Professor Ripley points out that "the magnitude of the achievement as a whole must constantly be kept in mind * * * it is an accomplishment unparalleled in history * * * and should be a matter for national pride. * * * It is all too easy to look back upon the record and to call attention to faults and shortcomings. * * * Happily it is clear that for the most part the financial methods were consistent with the highest standards of probity and good judgment." And again on p. 226: "The foregoing outline tells but a sorry tale * * * a range of operations from mystification and petty deceit to utter fraud. But the conclusion must be carefully avoided that, because such offenses have at times been committed, American railroad finance on the whole is unsound. Such an opinion would be absolutely unfounded. A large majority of our common carriers are certainly on the whole as honestly administered as are private businesses. Nor has the standard of integrity in the main ever been so high as it is at present." But these deliberate opinions, frankly expressed in straightforward and emphatic language, only cover a few lines in the middle of hundreds of pages devoted to the rather depressing comment upon all the frauds and scandals of American railway history from the day of Jim Fisk downward. It is hardly conceivable that an ordinary reader, who has to gain his knowledge of the subject wholly from Professor Ripley's story, would end by sharing the opinion that the Professor holds, after reading a book in which the adventures of the occasional stray sheep are told at length, while the history of the ninety and nine that remained respectably within the fold is passed over in silence.

Professor Ripley desires to maximize public interference. One would think that a supporter of interference by public authority would necessarily postulate two things: that the authority should be intelligent, and that the authority should be honest. Professor Ripley does not assert—as indeed in view of the history he could not—that either of these pre-requisites exist in the United States. As for intelligence, let us take a crucial instance. If intelligent regula-

lation is to be found anywhere, it is surely in that highly expert and respected body, the Interstate Commerce Commission. Yet in July, 1914, after an inquiry extending over more than twelve months, the majority of that Commission solemnly reaffirmed their refusal of three years earlier to permit the Trunk Lines to raise their rates. Under the compulsion of gross and palpable fact they reversed that decision some six months later. But it is safe to say that for every dollar Jim Fisk stole from the Erie—and he stole a good many—the inhabitants of the United States lost a million in the months succeeding July, owing to financial depression and trade dislocation consequent primarily on the unintelligent appreciation of the situation by the Interstate Commerce Commission.

What about honesty? In the midst of a scathing indictment of the quite recent mismanagement of the New Haven Railroad Professor Ripley enumerates among its crimes "wholesale bribery, veiled in various ways, of members of the legislature." And this is not in the Far West two generations ago, but in Massachusetts yesterday. Not a word is said in reprobation of those who were bribed. Does Professor Ripley take it as a matter of course that members of the legislature will be accessible to wholesale bribery? As for honesty in other than money matters, take this instance. The Interstate Commerce Commission are at this moment engaged in hearing at Chicago the application of the railroads in the territory west of that city to be permitted to raise their rates, with which, of course, the intra-state rates are inextricably entangled. Mr. Clifford Thorne is chairman of the Iowa State Railway Commission, and he is appearing before the Interstate Commerce Commission as counsel for (a) a number of Western State Railway Commissions, including his own, and (b) for a private trading association which dislikes the prospect of having to pay increased rates. The American public appear to see no objection. The Interstate Commerce Commission is evidently powerless, and the simple English expedient of disbarring Mr. Clifford Thorne is presumably not available. An Englishman, considering the propriety of further private regulation of railways, takes for granted the probity of Parliament and the Board of Trade and the Railway Commission. But what would he think if legislators were accused of wholesale bribery, and if Commissioners were as impartial as Mr. Clifford Thorne?

Take another instance, not from a Western state, but from the Federal Government itself. For years the railroads have claimed

that the payment to them for carrying the mails, which is practically in the uncontrolled discretion of the Postmaster-General, is inadequate. Some three years ago they succeeded in obtaining the appointment of a Joint Committee of the two Houses of Congress to investigate. That committee severely censured the Post Office Department and substantially supported the railroad contention that the method of payment was bad, that the arbitrary powers of the Department were unjust, and that the amount of payment was insufficient. While the committee was sitting, the Postmaster-General introduced and carried a Bill establishing a Parcel Post. The original limit of weight was reasonable. It has subsequently been extended to 50 pounds. No provision was made in the bill for payment to the railroads for the extra work thrown on them beyond the authorization of the Postmaster-General to pay to certain railroads a temporary increase not exceeding 5% of the amount they were then receiving. How the extended parcel post is working as a business undertaking may be judged from scores of reports in the American press: of, for instance, a warehouse at Wells, Nev., "where 80 tons of grain are held for shipment, sack by sack, through the parcel post"; of "a fast mail train delayed by the loading of two tons of wheat as parcel post"; or of "a car load of potatoes from Deeth to Haleck." From the moral point of view it is sufficiently criticized in the published words of ex-President Taft: "When we establish a parcel post—a good measure in itself—and make the railroads carry all the business we can get without adequate compensation, we are stealing from the railroads. That is what we are doing." But this is not all the story. When the report of the Joint Committee above mentioned, based on two years' study of the question, was complete, and its tenor became known, but before it had been officially presented, the Chairman of the House of Representatives' Committee on Post Offices, at the instance of the Postmaster-General, suddenly introduced a bill, the effect of which was further to reduce the payment which the Joint Committee had found to be inadequate, and to make the Postmaster-General absolute judge without appeal of his own cause. The bill was forced through the House of Representatives, the railroads being refused even a hearing, and sent up to the Senate. The Senate refused to pass it, whereupon a second attempt was made to jam it through in the rush of business before the adjournment by "tacking" it on to an Appropriation Bill. Thereupon the Senate threw out the Appropriation Bill, and the Postmaster-General, who, be it

observed, is a cabinet minister, has since publicly accused the railroads of attempting to "loot the post office revenues." I have told these stories (which are not derived from Professor Ripley's pages) at some length because it would seem that English readers, in forming an opinion as to the desirability of more or less regulation, should have regard to the public record, not only of the regulatees, but of the regulators.

Another point may be noted in this connection. The railroads in the United States are regulated by forty-eight separate states and the Federal Government—"fifty stripes save one," as a railroad president puts it—and in each of the forty-nine the authority to regulate is shared between the legislative, executive, and judicial branches of the government—branches whose respective functions are strictly delimited by written constitutions. Professor Ripley recognizes the existence of a hopeless welter of confusion. He speaks of "the well-nigh intolerable conflict of authority of the many public service commissions and state courts now at work. * * * No fewer than six different State Commissions are said to be taking a hand in the reorganization of the Wabash. The approval of each is necessary for validation of the plans. And it is impossible to obey so many masters. It is daily becoming more clear that the conflict of state and Federal authority can only be averted * * * by the assumption of unified control by the United States. Rates, service, and finance are so completely interlocked that satisfactory regulation in each field cannot be exercised except by the assumption of full authority over all three domains alike." That exclusive Federal authority will be established in the near future is most unlikely. For, as has been shrewdly pointed out, any member of Congress who voted to deprive his state of control of its railways would sign his own political death warrant. And such documents politicians do not sign with alacrity. But Professor Ripley is so whole-hearted an advocate of public regulation that even the "well-nigh intolerable conflict of authority" does not deter him from desiring to increase both in scope and minuteness the present mass of public regulation.

Professor Ripley's former volume was rightly entitled *Railroads, Rates and Regulations*. The new volume is called *Finance and Organization*. But its true title should be "Regulation of Finance and Organization." For throughout the leading idea is, not what the companies are doing, or are likely to do for themselves, but what they should be compelled to do by external authority. I confess myself not altogether clear in all cases as to what precisely the Pro-

is typical of his whole attitude), "be sound business policy to be more generous—sufficiently generous, that is to say, to make it certain that an adequate supply of capital for future needs will be forthcoming. The immediate danger is assuredly too great niggardliness in this regard. * * * There should be a frank recognition of the need of an ample return to private capital." And, again (p. 346), "On the whole the average rate of return upon the existing net capitalization is modest enough. It is certainly not more than fair in amount. That it does not exceed 5% at the present time seems to be well established." But again my criticism is that these few lines of somewhat half-hearted exhortation to greater generosity must be swamped in the mind of the ordinary reader by the pages upon pages pointing out how the wings of those responsible for the Frisco and the Alton and the Rock Island scandals must be clipped.

One quotation more.

"The primary lesson [p. 237] to be learned by railway managements is that not more than current earnings, but at all times far less, should be distributed in the way of dividends. The moral for the public is that it must be prepared to countenance such rates as shall yield a substantial sum in addition, not only normal rates of return upon capital, but to provide for future contingencies, especially the 'costs of progress.'"

This is excellent, and, though I might not agree with Professor Ripley as to what should be regarded as the normal rate of return for the common stock of an undertaking as speculative as a railroad in Texas, I could not wish to alter a word of it. This is what Professor Ripley really thinks. This is the aim that, if he were—as it is to be hoped he may yet become—a member of the Interstate Commerce Commission, he will doubtless set himself to accomplish. I cannot, however, think that this new book will help in that direction. It is surely time, more especially now that the railroads have been deprived of the right of managing their property, that the "hoary-headed bogeys" of Jim Fisk and the Credit Mobilier should be laid to rest. Perhaps the most useful contribution to the railway question in the United States at the present moment would be an equally well-informed, intelligent, and honest history and criticism of the faults, both of dishonesty and stupidity, of the public authorities of the United States in dealing with their railways. Let us hope that Professor Ripley will find time to write it.

W. M. ACWORTH.

REGULATION OF RATES OF COMMON CARRIERS BY THE FEDERAL GOVERNMENT ALONE*

BY WILLIAM A. GLASGOW, JR.

I venture briefly to call attention to the attempt made to regulate commerce by the act passed by Congress for that purpose in 1887, and subsequent legislation, and to suggest that we have yet much to learn in dealing with this subject, so broad in its scope, and equally important to the carriers and the general public who use the facilities provided for the commerce of the country. The time seems to have arrived when we should consider what may seem proper to improve and strengthen the lines we have laid out for dealing with this important subject.

Prior to 1887, the regulation of railroad carriers in the United States, so far as it was attempted, was confined to the efforts of certain States to restrain "corporate abuses," and the regulation of the vast and increasing "commerce with foreign nations and among the several States" had not received the attention of Congress, to which the subject had been entrusted by the Constitution.

In the New England States, with the exception of Massachusetts, Railroad Commissions had been created with duties "mainly limited to the inspection of the railway equipment and service," but in some of the Western States Commissions were established, by legislation, with powers intended to correct abuses and to bring the carriers, in their service, within a proper conception of their duties to the public.

Some of this legislation may have provided what has been called "forceful methods," but in the words of a distinguished senator of the United States, the policy of these states assured "the cultivation of a better understanding and state of feeling between the railroads and the people, and a sufficient mitigation of the local abuses most prevalent, to sensibly diminish the volume of complaint."

*An address delivered before The Law Association of Philadelphia, February 26, 1915.

At that time twenty-five states and territories had adopted the commission system, while five depended upon "legislative restrictions without providing any special means for the enforcement of their enactments," and in sixteen there was "no regulation in force or practically very little."

On March 21, 1885, a Select Committee was appointed by the president of the Senate of the United States "to investigate and report upon the subject of the regulation of the transportation by railroad and water routes in connection or in competition with said railroads, of freights and passengers between the several states," etc.

The report of this special committee was made on January 18, 1886, and as a result of an overwhelming public demand for regulation of interstate carriers, Congress enacted, on February 4, 1887, "The Act to Regulate Commerce," creating the "Interstate Commerce Commission," and intending by the powers of regulation and administration entrusted to this body, "to cut up by the roots the entire system of rebates and discrimination in favor of particular localities, special enterprises or favored corporations, and to put all shippers on an absolute equality": *Union Pacific Railway v. Goodridge*, 149 U. S. 680, 690.

It was found, however, by nineteen years' experience, that the powers entrusted to the Interstate Commerce Commission were insufficient to accomplish the purpose which Congress had in view, and which the public demanded, and on the 29th of June, 1906, Congress (by the Hepburn Act) re-enacted the Act of February 4, 1887, giving to the Interstate Commerce Commission greatly increased powers, and declaring with certainty, in many instances, the duties of common carriers, subject to the provisions of the act.

It is unnecessary for the moment to notice subsequent legislation, for by the last act above referred to, Congress gave to the Interstate Commerce Commission such administrative and regulative power as to enable it to correct almost any abuse from which the public may suffer and of which a carrier may be guilty.

In the meantime, the Constitutional Conventions and legislatures of the states had not been idle, and state "Corporation Commissions" or "Public Service Commissions" have been created in almost all the states, with powers, apparently, over intrastate commerce, equally broad and in many cases far beyond the powers

entrusted by Congress to the Interstate Commerce Commission, and with these two regulative or administrative powers, acting on the same or parallel lines, frequent doubt arises and difficulty is encountered to determine which hand shall control the carrier in the particular instance.

In the *Minnesota Rate Cases* (230 U. S. 352), the Supreme Court held that: "The fixing of reasonable rates for intrastate transportation was left," by Congress, "where it had been found, that is, with the states and the agencies created by the states to deal with that subject"; and, further: "Under the established principles governing state action, Minnesota did not transcend the limits of its authority in prescribing the rates here involved, assuming them to be reasonable intrastate rates. It exercised an authority appropriate to its territorial jurisdiction, and *not opposed to any action thus far taken by Congress.*"

The court further clearly intimates that when the time arrives (if it is not already here) "that intrastate transactions may become so interwoven" with interstate transactions "that the effective government of the former incidentally controls the latter," that this fact will not limit Congress in the execution of its constitutional power to regulate interstate commerce. The court then says (p. 432):

"But these considerations are for the practical judgment of Congress in determining the extent of the regulation necessary under existing conditions of transportation to conserve and promote the interests of interstate commerce. If the situation has become such, by reason of the interblending of the interstate and intrastate operations of interstate carriers, that adequate regulation of their interstate rates cannot be maintained without imposing requirements with respect to their intrastate rates which substantially affect the former, it is for Congress to determine, within the limits of its constitutional authority over interstate commerce, and its instruments, the measure of the regulation it should apply. It is the function of this court to interpret and apply the law already enacted, but not under the guise of construction to provide a more comprehensive scheme of regulation than Congress has decided upon. Nor, in the absence of Federal action, may we deny effect to the laws of the State enacted within the field which it is entitled to occupy *until its authority is limited through the exertion by Congress of its paramount constitutional power.*"

Attention was called by the court to the fact that "there has been no finding by the Interstate Commerce Commission" that the intrastate rates fixed by the State of Minnesota produced "unjust discrimination violative of the act; and no action of that body is before us for review." As a matter of fact, the Interstate Commerce Commission had not considered the rates fixed by Minnesota, but if it had, after investigation, found that such rates discriminated against shippers who were required to pay reasonable interstate rates, and

if the Commission had ordered the carriers to cease and desist from such discrimination, then it would seem that the court, under the *Shreveport Case* (234 U. S. 343), would have required the carriers to obey the order of the Interstate Commerce Commission "by so adjusting the other rates (Minnesota intrastate rates), to which the order relates, as to remove the forbidden discrimination." In other words, to decline to charge the rates fixed by Minnesota and adjust their intrastate rates to the basis of the reasonable interstate rates necessary to remove the discrimination found to exist by the Interstate Commerce Commission.

An interstate carrier must get revenue to properly operate its lines from its transportation service—intrastate and interstate. In many cases, illustrated by the *Shreveport case*, the whole system of rates is so interwoven that a change in an intrastate rate may affect disastrously the business of shippers paying interstate rates and *vice versa*, and as to the question of charges for transportation, the time seems to have arrived when Congress should consider whether a reasonable, non-discriminatory and uniform standard of rates should not be worked out under Federal regulation alone, which would be fair alike to shippers of interstate and intrastate traffic, and relieve the carriers of the embarrassing doubt and uncertainty as to which master they should obey.

I speak of the "adjustment of rates," for no carrier and no Commission can today make or fix rates on any commodity between two points, without adjusting the rate to a basis of relation to rates on the same or other like commodities, covering transportation both between the states and between points in the same state. The late Henry Fink, one of the ablest and most distinguished men in railroad management I have had the privilege of knowing, who discharged his duty with loyalty to the owners of property and with patriotic interest in his adopted country, said:

"The facts are that railroad companies have a very limited control over their freight tariffs; that the cases are exceptional where they have the power to *make* or establish rates; that generally they can only *adjust* their rates of transportation in accordance with certain conditions and circumstances over which they have no control. This is not only true of competitive traffic and interstate traffic, but also as to rates on traffic within a State, and on local traffic for which there may be no direct competition."

At this time it can hardly be doubted that all traffic, state and interstate, so far as rates are concerned, is inter-related.

This situation is illustrated by the case of *Chicago, Milwaukee & St. Paul Ry. Co. v. Iowa*, 233 U. S. 334, where it appeared that

rates for the transportation of coal from Southern Illinois to points in Iowa were duly filed and established with the Interstate Commerce Commission, but a shipper of coal from Southern Illinois, had the coal billed to himself at Davenport, a Missouri River crossing, and when the coal reached an interchange track at Davenport, it was tendered to the Chicago, Milwaukee & St. Paul Railway Company for transportation to points in Iowa, under the distance tariff established by the State of Iowa for intrastate transportation. The result was that the shipper of coal, by a combination of rates established by the State of Illinois, from Southern Illinois to Davenport, thence under the Iowa tariff to destination in that state, secured the transportation from point of origin to destination at a less charge than the interstate rates filed with the Commission. There is no doubt that the combination of rates fixed by Illinois and by Iowa destroyed the integrity of the interstate rates, and but illustrates the proposition that the intrastate and interstate rates for transportation are inter-related and interwoven to such an extent that the fixing of intrastate rates which may be used in combination necessarily affects the interstate rates for transportation.

Unless "a uniform standard of rates" is established, covering the interwoven traffic, state and interstate, it would necessarily "result that violations of the" Act to Regulate Commerce "as to preferences and discriminations" would inevitably follow (*Texas & Pacific Ry. Co. v. Abilene Cotton Oil Co.*, 204 U. S. 426, at page 440); and, therefore, by the fixing or regulation of rates by state commissions as well as by the Interstate Commerce Commission, the very purpose of the Interstate Commerce Act is impaired and different standards of rates are established, measured by state lines, and when this condition is shown, should not Congress deal with the situation as intimated by the court in the Minnesota Rate Cases, heretofore mentioned? Undoubtedly the power of the Interstate Commerce Commission to prescribe rates upon which traffic will move, and which will be free from unjust discrimination or undue advantage, is impaired and embarrassed by the fixing of rates applicable entirely within state lines, for if two states unite in fixing a low rate on any commodity, the interstate rate cannot, as a practical and commercial matter, be greater than the sum of the two intrastate rates thus fixed by state commissions. With such a situation Congress undoubtedly has power to deal.

As said by the late then judge, afterwards Mr. Justice Bradley (*Stockton v. Baltimore & New York R. R. Co.*, 32 Fed. 9, at page 17) :

"We think that the power of Congress is supreme over the whole subject, unimpaired and unembarrassed by State lines or State laws; that in this matter the country is one and the work to be accomplished is national; and that State interests, State policies and State prejudices do not require to be consulted. In matters of foreign and interstate commerce there are no States."

And as said again by Mr. Justice Bradley (*Robins v. Shelby Taxing District*, 120 U. S. 489, at page 494) :

"In a word, it may be said that in the matter of interstate commerce the United States are but one country, and are and must be subject to one system of regulation and not to a multitude of systems."

Since Congress has the power to establish "a uniform standard of rates" through the Interstate Commerce Commission, avoiding confusion and frequent injustice, it would seem that the policy of exercising this power, as justified by present conditions, is beyond doubt.

The suggestion here offered applies to the adjustment of rates alone, and would leave to the states and to their commissions the many matters of regulation necessitated by "the special requirements of local conditions," which are of no concern beyond the boundaries of the state which acts.

The question of revenue to be produced by a comprehensive system of rates upon "a uniform standard," in order to make possible the best, most expeditious and safest service, is one not limited to state lines, and the burdens necessary to assume in order to provide such revenue should be adjusted so as to bear with equality and justice both upon intrastate and interstate traffic.

If the state commissions are engaged in an effort to cut the basis of intrastate rates below that of interstate rates, or if the Interstate Commerce Commission is interested in protecting interstate traffic from advantages which it may be claimed intrastate traffic has, how, it may be asked with earnestness, can a comprehensive, harmonious and fair adjustment of railroad charges upon a "uniform standard" be established or preserved?

If Mr. Madison were here, would he not again observe, as he did in the Constitutional Convention, that "He was never more convinced that the regulation of commerce was in its nature indivisible and ought to be wholly under one authority." Congress undoubt-

edly has power, when the inter-relation of intra and interstate traffic is established, to take over the entire subject of rate regulation, and in the light of present conditions, it should be seriously and patriotically considered whether the time for such assumption of duty by the Federal Government has not arrived.

We have been so engrossed in the proper operation of removing grievances in the conduct of the business of the railway carrier, and by administrative and regulative supervision to prevent the recurrence of such practices, that we have hardly had time, after the operation and the application of antiseptic treatment, to consider what rules of living the patient should follow, so that hereafter he may live a clean, useful and prosperous life, to the advantage of the community and for his own well-being. It now seems time to consider the future of the patient, and by constructive work help him to build up to the point where his own prosperity may add to the general good.

It would seem essential that there should be but one master to control the rates charged by carriers, so that, as far as possible, a fair, reasonable, harmonious and sufficient basis of rate adjustment may be established and maintained, and the present conflict of authority, which was of little importance when interstate communication and traffic were less frequent, be removed by Congress, in recognition of the fact that we live in a country indivisible and bound together by ties of a common interest.

THE PUBLIC CARRIER AND THE WAGE SCALE*

BY HON. CHARLES NAGEL.

Mr. President, and Gentlemen of the St. Louis Railway Club :

I cannot say that I am advised of the character of the membership of this Club. I assume that, in one fashion or another, you must be engaged in the railway business, but in what respect you may be interested in the different phases which I propose to discuss, I do not know. Nor do I much care about that feature of the matter ; because I shall follow a well-accepted habit and discuss the question with a good deal of freedom. Unless I can treat a subject in that manner, I do not care to enter upon it at all.

I selected advisedly "The Public Carrier and the Wage Earner," although I imagine a good many of you would have thought that I ought to be glad to avoid the subject. I do not feel quite that way about it, because I have no apologies to offer with respect to my position in the matter of the arbitration at Chicago. I am always willing to be shown that I have made a mistake in judgment, and I always resent a challenge to my integrity.

I am glad, personally, that this subject is now presented in such fashion that the public, which I then tried to interest, must become interested as a matter of necessity. I have no disposition to wear out your patience with a discussion of the details of the arbitration, and still less am I disposed to discuss my personal experiences in connection with that arbitration ; that is of no concern, I imagine, at this time. I felt perfectly sure of what I tried to do, and I have seen very few efforts to demonstrate to me that I made a mistake. In so far as the challenge against me was concerned, I accepted it with some sense of humiliation that at my time of life anybody should try to impress me in that way.

So much for that. The questions which presented themselves to me during that arbitration are liable to arise again in the immediate future ; and I propose to tell you, briefly, without dwelling upon the merits or demerits of our conclusions, what some of the considerations were that guided me in arriving at my own conclusions.

*Address before the St. Louis Railway Club, May 12, 1916. Mr. Nagel was one of the two neutral arbitrators in the Engineers and Firemen's Arbitration in the spring of 1915.

First of all, I found that the demands of the men, and the responses of the railroads were submitted to us as though we constituted an independent court, to try a case presented by two parties in litigation. It is true, we had what we call two "neutral" arbitrators—but we had before us two parties, and to my mind, the great public, which the neutrals were in some measure to represent, had no part or opportunity to be heard in behalf of its interests before that tribunal.

The demands were tried as an issue presented practically upon the pleadings of the men and the railroads; and the public (an interested party in the result, in more ways than one) had no part in shaping the evidence, or the case upon which we were to pass. That seemed to me to present an obvious difficulty, and I think that difficulty will appear again. Then, I was impressed by the fact that at that time there were so many "lame ducks" among the railroads; a good many of them were in the hands of receivers; others were threatening to go, and have since done so.

The demand was for standardization of wages and conditions. It was obvious that any rates that were granted upon any road which was prosperous would have to be met by other roads less prosperous; and in the nature of things, we were restrained, in our consideration of the wage standard—a uniform wage, east and west—by the circumstance that a very considerable number of western roads, at least, were in immediate difficulties. There were other things that weighed with me, and I propose to dwell upon them, at least, in considering the future.

We had before us demands upon the part of the engineers and firemen. No one would be more prompt than I to testify to the splendid impression that these men made on the witness stand. I think that any American would feel proud of his country to see the men who appeared before us. I will say that, almost without exception, they were men of fine physical appearance, and they were characterized by a promptness in testifying, by an unwillingness to shift, that was altogether splendid; so that all my feeling would go out to these men. But there were other circumstances that appeared. The demands were so shaped that only a part of the engineers and firemen could be considered; that is, the difficulty was that the men best situated had their demands in, while the men less advantageously situated were left without relief from us. Thus, the men who suffer from uncertain employment, dependent upon the prosperity of the

road, the amount of business, being employed say two days, and then a day or two off—those men had no opportunity. They had no demand before us to present the question whether there ought to be some kind of guaranteed compensation for them, as long as they are held under orders.

Now, I felt that the better situated men were making the demands, and that the more poorly situated men could not be substantially relieved, under the demands as they had been framed—and you know enough about organization to know how that might happen.

The fact is that there is a very substantial difference in the character and compensation of various runs. Some are relatively easy, others hard; some commanding good wages, others much less so. Frequently, relatively light work and good compensation are combined in the same run. Under the seniority rule, the older men having the choice of places, therefore enjoy a distinct advantage. It may indeed be argued that in one sense the better conditions which the older men enjoy are intended to compensate for the less favorable conditions under which they work during the earlier stages of their employment. It cannot be overlooked, however, that these improved conditions are fairly remote, and that, owing to the uncertainties of fate and fortune, they may never be reached by a particular employe. It did not seem to me that this disparity of conditions should be unnecessarily accentuated—a result which any award of the demands as they were presented, would necessarily bring about in some measure. In no event was it within our power to afford relief to men who are held under orders without actual employment.

What impressed me still more was the fact that we were confronted with demands of only certain employes of the railroads. We knew, of course, and heard during the hearing, that other men similarly organized, also made demands from time to time; but the first inquiry directed to a large body of employes of railroads who were not organized, brought out the very enlightening fact that they were not the recipients of very frequent increases in salary.

In other words, we had to deal with a large system, which had to meet demands again and again from certain classes of its employes, while other classes of employes were neglected—forgotten. It may be that this neglect must be attributed to the fact that the pressure from other quarters was too strong.

Now, I could not close my eyes to that circumstance. I asked what the station agent got, and what the clerks got—how many hours the man at the station worked, and what his responsibilities were with respect to telegraphing—what his duties were with respect to the train itself, and to the protection of the general public. You know more about those things than I do; but, at the same time, it seemed to me that there was a class of men who ought, in all fairness, to be considered before we went too far in increasing the rates immediately presented to us. I am telling this to you just as the matter presented itself to me.

There was still another difficulty—the arbitration was so framed that the engineers and firemen presented their sixteen demands, calling for the amendment of rules and increase of wages, and that the railroads withdrew all the demands they had made for correction in those rules and rates. In other words, it read that anything that we granted better than that which the men already had, might be accepted; but wherever the men had anything better than we granted, that could be retained. They could combine the rules and the rates in such a way as to spell—Heaven knows what!

There was no railroad man, and no engineer or fireman—who could even guess at what the consequences of our award would be.

Now, in my judgment, that was unfortunate; because, if there is to be a real arbitration, it should meet the whole situation.

We were prevented from bringing about anything like equalization, because we were bound down to a consideration of certain distinct demands; we could not grant anything that was not asked for, and we could not correct anything in an effort to give a corresponding advantage in another direction. That hampered the arbitrators, and made it very difficult to arrive at any conclusion that would address itself to the judgment of an independent man. Notwithstanding these facts, after five months of sessions we came to a conclusion. We granted practically every rule that had been asked for, and during the hearings we had been told that the men were more interested in the rules than in the rates.

We granted many increases in the rates; I think there was but one point at which we fell below that which had been granted in the Eastern award. In substantially every respect, we granted more than the Eastern award had given.

There was another consideration—the demand was for standardization of rates throughout the country. If we had gone very far beyond the award of the East, we of course defeated the very standardization for which the contention was made. So we felt compelled—that is I did—to stay reasonably within the award of the East, whenever it covered any particular question. But for my part, it seemed more important to get intelligent and satisfactory rules for the men, to protect them as far as may be, in that respect, and to leave the rates reasonable, but subject to such changes, modifications and increases as later developments might justify. In other words, I felt that the men got a splendid foundation for the presentation of any just demands which they might have thereafter.

What is the result? New demands have now been submitted; only one of them is a renewal of a demand that we were asked to pass upon—and that is the request for time and a half for overtime, in freight service—that is all—in spite of the complaints against the award which were sent broadcast over this country.

None of the other demands have been renewed at this time; the only one, I repeat, that has been renewed, requires time and a half for overtime in freight service. That demand we disposed of in conformity with the Eastern award, and I regard that as presenting a very difficult question.

I cannot say that I think the matter has been satisfactorily disposed of. There is a difficulty; but for my part I could not believe that it is a safe principle to put a penalty as large as that, or perhaps any penalty, on overtime. It is a pretty drastic measure to resort to, and it is dangerous to both sides.

On the other hand, I would favor a rule which would be designed to discourage overtime just as much as possible. The service is not a light service, and ten hours is a good deal of time to work at that kind of business. While the exigencies of railroad work are such that no hard and fast rule as to hours can be made (we all know that); at the same time, it seemed to me that there should be a limit set somewhere; something short of the sixteen-hour limit fixed by law—that there should be something done to discourage and control unreasonable overtime. I admit that we did not settle it; I did not know how to settle it; but we had staring us in the face the adjustment that had been reached in the East, and the inherent difficulty of finding a rule that would fairly protect both sides.

However, to repeat, this is the only demand that has been renewed; and I regard that circumstance as practically a confirmation of the fact that, taking it all in all, the award was pretty satisfactory to the men.

When you take the questions for interpretation which were submitted to us afterwards—over 200; I believe more—over which we spent some six or seven weeks, which gave us an opportunity to find out how difficult it is to adjust the combination of old rules and new rates, and new rules and old rates—and when you estimate the results reached by us, I think you will conclude that the representatives of the men were not quite as dissatisfied as they had expected to be. But, be that as it may, we have new demands, and we have the same general question presented.

We have been told, now, at least in some places, that there will be no further arbitration; and we are left to infer again that the public is not immediately concerned. I doubt both propositions. I think there will be other arbitrations; I do not think that my conduct in that arbitration was significant enough to destroy the system. Furthermore I think that the public is so vitally interested that all parties will hear from the public before they get through—and we may just as well remember that when the public is interested, it generally makes the decision. Certainly it does in legislative matters, usually in executive branches—and to some extent in judicial decisions.

The public is a very powerful factor in a republic, and it is liable to be in this matter. The only thing to do, therefore, is to present all these questions fairly and openly and without fear.

We may all be mistaken; I suppose most of us are mistaken in respect to some phases of the question; but we ought to approach it and talk it out frankly, in order that we may arrive at a sensible conclusion.

Now, I am not going to discuss the merits of the eight-hour law at all; that is for you. I am going to call your attention to the fact that we are dealing now with a dispute between employes and a public carrier—and that is not to be likened to a dispute between the employes and the proprietors of a private factory, for instance. It is an entirely different proposition.

A public carrier is a quasi-public corporation, and in receiving its franchise from the State, it accepts corresponding obligations to the

public. In other words, a carrier has got to move, no matter whether there is profit in the operation or not; it has got to serve the public, and the public is vitally interested in the character and in the continuity of the service rendered. One of the advantages enjoyed by the older railroad employes is that the continuity of the railroad service guarantees practical stability of employment. For that reason, I submit that every single question in connection with such demands presents itself in a new light.

If a stockholder is compelled to devote his capital to the service of the public, then he must have a right to ask of the public that the carrier be run under conditions that will make it possible to have some kind of a return. If that is not guaranteed by the conditions made, railroad building will stop—unless the Government does it with its own money.

Now, I know we have the past to reckon with, and we say that in the past, the stockholders have done this, that, and the other thing—but, gentlemen, no country can permit itself to dwell too long upon conditions that have existed in the past. We have got to deal with the present.

A great part of the railroad stock in this country is now held by new acquisition, and whatever we do, we have got to bear in mind that the income (which is dependent upon rates) and the out-go (which is largely measured by wages), must make it possible to have some kind of a return upon the investment. Without that, the machine cannot work—and eventually there will be no machine, at all. That is one fact. The next step is that the rates to be paid by the shipper, and the wages to be paid to the men must bear some relation to each other. If there is such a relation, it is a matter of accident, and not of method or system.

We were in session in Chicago for five months passing upon the wage question presented by the engineers and firemen. In another room sat one member of the Interstate Commerce Commission for, I think, several weeks, hearing evidence upon the question whether the rates paid by the shippers should be increased. We never got together; we were never permitted to look at both sides of the ledger; nothing was submitted that would enlighten us as to the relations between rates and wages to be awarded. I think if we had talked with that member of the Interstate Commerce Commission, probably there would have been some charge of conspiracy made against us!

According to the most obvious rules of successful business, the proprietor must know how much he receives before he determines how much he is to pay out.

The common carrier must be put in a position to establish a proper relation between the public's payment of rates and its own payment of wages. Now, that result will be secured satisfactorily by arbitration, or it will be done in some other way. There is no doubt that if we go on in this way and say: "We will not have any arbitration; whatever the arbitrators do is not satisfactory," we will have some kind of a Commission in charge of both functions—the fixing of the rates and also of the wages—so as to make the representatives of the Government responsible for the consequences of the whole decision. At present, no Government agency is responsible for anything; if the rates are fixed in a particular fashion, and the road cannot get through with its income, the answer is: "You are wasteful; you do not manage right."

But if the responsibility is fixed upon one Commission to fix both the rates (representing the income) and the wages (representing at least a large part of the outgo), then there will be some approach to a responsibility laid upon some Federal power that will be compelled to make satisfactory decisions, or to give an explanation for failure. Now, it will come to that, unless we arrive at some plan of successful arbitration.

Turning to the matter under consideration, we were told that the roads could not afford to pay the increases if we allowed them. Well, if they could not at that time, and if they can afford now to pay the increase that is now asked, the roads furnish a better evidence of sudden prosperity than the most rosy reports that I have read from the Secretary of Commerce, up to this time. We have proof of marvelous growth in one year—if that can be done.

But I go further: If the railroads can grant these increases, and are contemplating granting these increases, then, in my judgment, they, as public carriers, are bound to consider the condition of the other employees at the same time. I see no escape from that. A private business may do what it will, as long as it can, but a public carrier, charged with a public obligation, is bound to consider the welfare, the safety and the security of every employe, and to put them all upon a basis where they can render satisfactory service to the public. I see no escape from that conclusion.

Now, people say: "Why don't these men press their demands?" The answer seems to be that they are not unionized. But that is no answer. I certainly do not object to unions; I am one of those who believe that if it had not been for the union, the wage earner would not be nearly where he is today. I do not deceive myself about that. This world is not altruistic by a long sight. There are very few proprietors in the railroad business or anywhere else that do not need prodding to be good; in fact, very few of us form an exception. But that does not relieve the public carrier from the responsibility to the men who are not unionized.

When an effort is made to put things straight, and light is thrown upon the facts, the public carrier ought to say: "I will take in the whole horizon; I will see the whole picture; I am bound, in justice to my stockholders and to the public, to consider all the employes, and to have the advances made with relative justice to each." You may do in a private factory what you wish; but you cannot do with a public carrier what you wish. It employs men who serve the public, upon the careful performance of whose duty the security and the service to the public at all times depends; you have got to consider that.

Now, we are told, there will be no more arbitrations. I say there will be probably no more arbitrations such as we had, because I trust that no Government will ever again compel a one-sided arbitration like that.

I think if I had carefully read those terms (I did not have the matter under consideration more than a few hours)—if I had carefully read the terms of the arbitration, I should have refused to serve; because it would have spelled a hopeless job to me, upon reflection. As soon as I recognized that I was to consider one side, and could not consider the other—could not make an equitable adjustment between two parties who ought to live in harmony with each other, I would have said: "Excuse me; I know I cannot succeed."

So, in my opinion, there will be no more one-sided arbitrations, if the railroads in their own behalf offer that objection, because they ought not to submit to it again.

In my judgment, the railroads ought to take the position that if there are any more arbitrations, the whole situation must be submitted, including the interests of men and women whose demands have not been presented, as a body—so that the whole wage scale of the

railroads may be fairly considered at one and the same time. They belong together; they depend upon each other; they should support each other; in the long run, that method is better for all of them than any of the methods that have been pursued up to this time.

It is said the public is not interested. I know the public was not interested when I was being pounded up there in Chicago. They did not care; they knew the controversy was settled for a year, and that is as long a period of peace as we generally have in this country. They contented themselves with saying that it was probably a compromise; neither side was satisfied, etc.

But the public is interested now; you may read that in every newspaper. Congress will be interested; everybody will be interested. It is indeed a public question. And why not? It involves a public carrier with quasi-public employees. What is a railroad but a public service agency?

How far are we from Government ownership now? Heaven knows I do not want Government ownership. Nothing is so incompatible with the idea of Government ownership of railroads as a republic; no kind of Government would manage railroads so poorly as a republic; we know that.

If you want to see railroads managed properly, go to Germany where, as we are told, they have what is styled "Beaurocracy." They can do it. I was there in the early part of the war, and I saw something of it. I saw perhaps the most complete and sudden transition from a peace state to a war stage that was ever known in the world—from Sunday morning to Monday morning, there was a complete transition. Sunday everything was moving along under civil authority; Monday morning, everything was under martial law. Wagons that were hauling private products one day were hauling ammunition the next morning. I watched them for a number of days; at the end of a few weeks I read the simple statement—it was no boast, simply an announcement by the Government—that mobilization had been completed, and that there had not been a single railroad accident. Now, there is management for you. I do not believe we can do that. I am afraid of Government ownership, because if we once enter upon enterprises of that kind, there will be need for a concentrated power of which we have never dreamed, and that will mean a complete change in our Government. That would be inevitable—that change—and if employes think that they

will get any more from the Government than they are now getting from private ownership, let them examine into the salaries of any department in Washington.

In my department there were a few men who drew \$6,000; a few others at \$5,000; a few more at \$4,000; a larger number \$3,000; \$2,250 was a very good salary; positions paying \$1,800 to men were sought; the great majority of the force getting below that. Now, those are the salaries paid by the Government—and I do not want to see our railroads get to that basis—but I want to also say that in my opinion, we are steering that way.

What is ownership, by the way? Ownership is in the main the right to dispose of the income. I do not much care who has the title to stock, so long as I get the dividends.

What does the Government do now? It fixes the rates shippers have to pay, doesn't it? Suppose the Government were to go a step further and fix the wages? There is the whole situation from beginning to end. What is there left for the stockholder but to sit down and guess whether he will get anything at the end of the year, as a return on his investment? And if we cannot arrange these things among ourselves, without doubting the motive of every man who serves—if we cannot have arbitration, does anybody suppose there will be anything left but a Commission that will fix both ends?

We are bound to come to some conclusion, one way or the other, because we are not going to live in eternal doubt. The American people are an intensely practical people, and we sometimes resort to mighty short expedients to get to a practical result.

We have "preparedness" on our minds now. That ought to be suggestive. What does preparedness mean? Appropriations? Yes, it does mean that to a good many people. Increase in the army? Yes, it means that to a good many people. A navy? Yes, it means that. But does it mean anything else?

Without going into details, it means an industrial system—it means a relation between business and the Government—it means something besides a harassing policy designed to keep everybody in hot water. It means also a protective policy which will allow business to live, so long as it does the right thing—which will not make a business a prey for penalties simply because it is successful.

We cannot be big if we are ashamed of big things; we are bound to have them. This is true even with the ordinary industry; that has been so in Germany; it has been shown in France, and it is being developed in England now, because she has been compelled to resort to exactly the same methods that her antagonists employed at an earlier date.

If we are going to have a system of preparedness, let us not dream that we are just going on as individuals, everybody doing as he pleases. There must be a system, with a head to it—not forty-nine different kinds of troops, but one army, commanded by one man—not a debating society to determine who is to go there and who is to come here.

That is what we will come to—business, not to sustain the army, but to sustain the civilian while the army is out—that is what preparedness means.

And our common carriers? Why, it will mean highways all over this country—railroads and other roads and canals not built where we now know that we want to send troops and provisions, but built fifty years in anticipation of possible needs—the establishment of roads and railroads that can be utilized at the command of a central power when an army is to be moved; that is what preparedness means—if we are serious about it.

That is a real problem for a Republican form of Government. All I wish to say here, now, is that the more we have of unrest, the more we have of unwillingness to consider together, the more do we demonstrate the unsafety of such a course, where our interests should be mutual. The more we realize that the proprietor and the employe have the same interest in reality; the more we demonstrate our capacity to do these things properly, calmly and fairly, in council with each other across the table, the faster will we move on the way to true preparedness, and the surer will we be to stave off the threat of centralized Government control of all quasi-public machinery.

SLEEPING CAR TRAVEL IN AMERICA AND GERMANY

BY PROFESSOR GUSTAV SCHIMPF, Aix-la-Chapelle, Germany.

Translated by Francis A. Bonner from *Zeitung des Vereins Deutscher Eisenbahnverwaltungen*.

The Americans have been our schoolmasters in many branches of transportation. To them we are indebted for our urban rapid transit lines, for the modern electric street railway, for the four-axled passenger and freight car, and finally for the sleeping car. With the immense distances between cities prevailing in the United States there was, of course, a great desire to make the long journeys from one city to another by night, and to Pullman, an American, belongs the honor of having devised a car in which beds were provided. One using these cars could spend the night as otherwise accustomed to spend it, in bed, and arrive rested and fresh at one's destination in the morning. The sleeping car soon was universal in the United States. During a journey the Flemish engineer Nagelmaker became acquainted with the institution; he transplanted it into Europe, and so was born the International Sleeping Car Company at Brussels. This company in 1909 owned 750 sleeping cars and had solid sleeping car trains, so-called "de luxe trains," running between all the principal cities of Europe. Later the state railways built their own sleeping cars and today the Prussian State Railways own 266 sleeping cars, of which from one to three are provided in night express trains. In the last two summers before the war solid sleeping car trains ran between Berlin and Munich and Berlin and Frankfurt-on-the-Main.

The style of car used in Europe differs materially, in arrangement of beds, from the American model. In an American car the beds are arranged lengthwise; the entire car being a single sleeping room, with the individual beds shut off from the aisle by a curtain. With an exterior car width of about 3 meters (9.8 feet) there is possible the respectable breadth of 1 meter (39.4 inches) for the bed, which renders it very comfortable. In the European sleeping car, on the contrary, the beds are arranged crosswise to the direction of

travel and enclosed by pairs or fours in separate compartments. The lengthwise bed arrangement has this great advantage, that jarring during travel is rendered less perceptible, so that one sleeps more restfully. But the single sleeping room arrangement entails something of the uncomfortable and unconventional, according to our ideas. Even if one may learn quickly to dress and undress in a lying-down position, still it may well happen to one that in the morning, returning only partly dressed from the washroom, one finds that the coach meanwhile has been transformed into a day car, so that one has to finish dressing before the eyes of the other passengers.

Between the utilization of these cars in America and in Europe, especially in Germany, there is a vast difference. In America the sleeping car has become literally a common property. Pullman, through his invention of the sleeping car, say the Americans, has lengthened human life; and the American gladly makes use of this life-prolonging virtue of the sleeping car. American night through trains consist almost entirely of sleeping cars, hauling only one or two ordinary coaches for the local traffic. If important intermediate cities are passed during the night by a through train, a sleeping car is made ready at each, which then is picked up by the train. Likewise the train will drop a sleeping car destined for the intermediate city, to remain standing at the station until morning. If the distance between the two cities is too short to pay a sleeping car service, provided a waterway exists, state-room steamers ply between them in the favorable season. For example, there ply, or did ply, such steamers between New York and Providence, New York and Albany, and Chicago and Milwaukee, distances which are covered by rail in $4\frac{1}{2}$, $3\frac{1}{2}$ and 2 hours.

Not so in Germany. Leaving out the few de luxe trains and the above-mentioned sleeping car trains, the ordinary coach is the rule in our night express trains, and the sleeping car the exception. Even should a sleeping car be available, most travelers prefer to spend the night on a seat, sitting up or crouching over or half stretched out in an uncomfortable position, to arrive at their destination in the morning stiff and unfit for business. Whence comes this German preference for so health-damaging, life-shortening a brand of nocturnal rest? The cause is to be found in the cost of a sleeping car journey.

The sleeping car charge in the United States, according to distance, amounts to from \$2 to \$3 (a night), that is, 8.5 to 12.75 marks. With us the charge, according to class and distance, is from 8 to 13 marks (\$1.90 to \$3.09). In themselves these charges are almost identical with those in the United States. A more decided difference arises, however, when one recalls that money with us has nearly double the purchasing power it has in America. This may be inferred from the simple fact that in America one pays for a room at a metropolitan hotel generally \$2 to \$3 a night, against 3 to 5 marks with us (71 cents to \$1.19). The American thus pays for a bed in the sleeping car hardly more than for a bed at a hotel, and for him, therefore, it is much more advantageous to make a long journey by night in the sleeping car instead of by day, since he saves a whole day's expenses and gains an entire day for business. Indeed, the extra payment for the sleeping car shrinks still farther since he saves the charge for use of the parlor car attached to the day train (corresponding to our through-train excess fare), which amounts to half the sleeping car ticket.

For the German traveler, on the contrary, the difference in cost of day and night journeys is much more noticeable if he is accustomed to using Class III by day* since use of sleeping cars is restricted to holders of Class I and II tickets. The man who makes a trip of 450 kilometers (279 miles) in the third class coach of a through train pays 14.90 marks (\$3.55); but for the trip second class with a sleeping car ticket, by contract, he would pay 31.45 marks (\$7.49); that is, more than double, and the excess of 16.55 marks (\$3.94) is considerably higher than the cost of staying over night at a hotel or the expense of a day trip. That is the chief reason why so many travelers do without the sleeping car.

It is to be expected that after the war we shall have to deal with far more distant boundaries. (Sic) So in long distance travel, we shall have to reckon with much greater distances, hence shall approach the conditions prevailing in America. There will arise a more pressing necessity of using nights for travel, and under these circumstances it seems desirable from the standpoint of public economy that Class III sleeping cars be introduced in Germany

*How close this comes to meaning the whole German traveling public may be concluded from the fact that in 1913 (latest year reported) only 0.12 per cent of all passengers on German railways bought Class I tickets; 7.35 per cent took Class II; while 92.53 per cent took Class III or lower, thus being unable to purchase sleeping car tickets.—F. A. B.

after the example of Sweden and Norway. The sleeping car charge would have to be at all events a low one. It could be about half the present Class II sleeping car rate, that is, 4 to 5 marks (\$.95 to \$1.19).*

It is not to be inferred that the introduction of Class III sleeping cars at such reduced prices would be uneconomical for the railroad. The utilization of seats on night express trains, as well known, is not great. This comes about because the night express trains are used for local travel only near the beginning and end of their journey (a night train from Berlin to Cologne, for instance, between Berlin and Magdeburg and between Dortmund and Cologne). In the middle portion of the journey the hours of the night express train are so unfavorable that it hardly comes into consideration for local travel. If the average seat utilization of all trains on the Prussian State Railways, to take an example, is 25% (in the case of day express trains perhaps 50%), it follows that the utilization of night express trains is to be found between 15 and 20%. Utilization of the sleeping cars, on the other hand, is known from experience to be very great, because most passengers use the train for the entire distance. The dead weight per seat in the case of a first and second class through train car is 2,760 kg. (6,072 pounds). Figuring 20% seat utilization in both above classes of night express trains and 60% utilization in sleeping cars, we arrive in the first case at a dead weight per passenger of 5,175 kg. (11,385 pounds), and in the second case 4,900 kg. (10,780 pounds). Thus the cost of motive power for transportation in our sleeping cars is no higher than for transportation in the ordinary coach, and the car charge need be only remuneration for provision of linens and a porter. Assuming that in the case of the Class III sleeping car similar relations of weight would exist in comparison with the day express train car of Class III, the sleeping car rate will have to be likewise only remuneration for provision of the linens (of a plainer sort) and the porter. For this an extra charge of 4 to 5 marks (\$.95 to \$1.19) will suffice in any event.

Introduction of Class III sleeping cars would enable us to increase materially the number of sleeping car trains and to run them between all the larger cities as soon as the distance reaches 400 kilometers (248 miles).

*The proposed charge for third class sleepers, it is interesting to note, is almost identical with that for American tourist sleepers, our second class, which is generally \$1 per night, about half the sleeper charge second class in Germany.—F. A. B.

Transportation of passengers in solid sleeping car trains offers manifold advantages over attaching sleeping cars to ordinary trains. In the first place the number of intermediate stops can be materially reduced, and since an adequate night's rest is more important than a shortening of schedule time, the trains in many cases can be operated on slower speeds; thereby the locomotive power would be more fully utilized and the cost of transportation reduced, while on the other hand the journey would be more restful.

STATISTICS OF AMERICAN RAILWAYS

FOR THE YEAR ENDING JUNE 30

1915

PREPARED BY

SLASON THOMPSON

DIRECTOR OF THE BUREAU OF RAILWAY NEWS AND STATISTICS

INTRODUCTORY

The European war was the dominating factor in railway affairs in the United States, as in nearly all other lines of industry and human intelligence throughout the year 1915. Coupled with this all-pervading influence, the numerous and often ill-conceived innovations in accounting effective since July 1, 1914, have robbed railway statistics for both the fiscal and calendar years of 1915 of their chief value for comparative purposes.

The continuity of official American railway statistics, dating from the employment of Prof. Henry C. Adams as official statistician of the Interstate Commerce Commission from its organization in 1887, received its first shock in 1908 when the returns from switching and terminal companies were excluded from the summaries. In 1911 the spirit of innovation for innovation's sake moved the Division of Statistics to substitute three territorial divisions for the ten familiar groups in which the country had been divided since 1890; and also divided the railways into three arbitrary classes along revenue lines. At the same time it recast the statistical tables in such a form as to force the abandonment of the convenient sized volumes in which the reports had been printed from the start.

Before the accounting officers of the railways had time to thoroughly familiarize themselves with these minor changes, or to give them the value of an established series for comparative purposes, a revised form to be used in annual reports of the carriers was adopted. This went into effect on July 1, 1914, and it is from the

reports made on this form that the statistics of this Bureau for the year ended June 30, 1915, have (with due attention to variations) been compiled.

While it cannot be questioned that many of the changes adopted in this revised form make for a greater certainty and clarity in railway accounting, its advantages are more than counterbalanced by the breaks in the continuity of the items and tables whose imperfections, through years of consecutive use, were realized and discounted. In the matter of the service and compensation of employes the innovations in the revised form are oppressive in detail and utterly destructive of the valuable body of statistics that has gradually accumulated on this important feature of railway operation. Previous forms divided railway employes into 18 classes; the new system divides them into 68, of which one-third, at least, are not distinctively railway employes at all. In various other lines the revised system multiplies the items of inquiry into details for which there is neither excuse nor statistical use. The mere filling out of these forms has become both burdensome and expensive. It is no exaggeration to say that tens of millions of dollars are wasted annually on monthly and annual railway reports of little or no significance.

In the presence of the all-pervading influence of the European war on every phase of American commerce and domestic industry, it has been impossible to trace with any authority the effect of the findings in the various railway wage and rate hearings during the year. That the partial concession of advances granted by the Commission in the Eastern rate case, in August, 1914, followed by the more liberal decision on the rehearing in December, helped the roads in the Eastern district materially through a depressing year is certain, but the record due to the reactions from the war fails to disclose the extent to which they profited by these decisions. Economies of operation were more in evidence than increases in revenues. In fact, where the revenues from operation for the half year ending June 30, 1915, show an actual decrease of less than \$11,000,000, the expenses of operation were reduced by over \$56,000,000. It was the persistence in these economies through the second half of the year, as much as the revival in traffic that became evident in July, that enabled the railways to finish the year with the largest net earnings on record.

RATE REDUCTIONS CONTINUE IN 1915.

Where there was a practical balance in the decisions by the Commission dismissing complaints and granting reductions in 1914, the tell-tale pendulum in 1915 once more swung against the railways, as is shown in the following table which distributes these decisions according to the Commissioner rendering them:

SUMMARY SHOWING THE TREND OF DECISIONS IN RATE AND ADVANCE TARIFF CASES, WITH TERMS OF COMMISSIONERS RESPONSIBLE FOR THEM:

Opinions by	Term Expires Dec. 31	GENERAL DOCKET		ADVANCE TARIFF DOCKET	
		Dismissing Complaints	Reductions or Reparation	Permitting Advances	Denying Advances
Chairman McChord.....	1922	8	9	7	5
Com'r Clark	1919	11	15	3	5
" Clements	1920	7	10	4	4
" Daniels	1916	8	4	8	3
" Hall	1921	8	16	4	3
" Harlan	1918	15	14	6	5
" Meyer*	1917	3	14	5	3
The Commission .....	....	64	65	25	11
Total		124	147	62	39
Percentage		45.76	54.24	61.37	38.63

*Elected Chairman March 1, 1916.

It will be perceived that the preponderance of decisions granting reductions was offset by the higher proportion of decisions permitting advances, which may be taken as gratifying evidence of the Commission's recognition of the needs of the railways. The record of the Commission's decisions on the General Docket for the past six years stands as follows:

NUMBER OF DECISIONS

Year	Dismissing Complaints	Per cent	Granting Reparations or Reductions	Per cent
1909.....	138	39.7	219	61.3
1910.....	138	41.1	198	58.9
1911.....	93	37.4	156	62.6
1912.....	132	35.2	243	64.8
1913.....	118	42.8	158	57.2
1914.....	111	49.8	112	50.2
1915.....	124	45.8	147	54.2
Total	854	40.9	1,233	59.1

It must not be inferred that the Commission's activities are covered by these decisions. During the year ending October 31, 1915, no less than 6,500 informal complaints were filed, compared with 7,880 for the corresponding period of the preceding year. In what is known as the Special Docket 6,690 applications were filed and 4,742 orders were entered authorizing the carriers to refund overcharges to the amount of \$312,864.

During the same period (November 1, 1914, to October 31, 1915) the Commission conducted 1,543 hearings, in the course of which approximately 200,438 pages of testimony were taken. Is it any wonder that the Commission has to employ 45 examiners to conduct the majority of these hearings and digest the vast array of testimony and exhibits for its final consideration and decision?

INCOME ACCOUNT FOR THE CALENDAR YEAR 1915.

Where the disturbance in the even tenor of railway statistics through innovations in accounting methods has put the railway statistics for 1915 out of scientific alignment with those of preceding years, the effects of the European war upon railway traffic and consequently on railway revenues were not conspicuous until after the close of the fiscal year. During the six months ended December 31, 1915, railway traffic responded in a most remarkable degree to the European call for enormous quantities of war munitions and foodstuffs. The demand came so suddenly as to tax railway facilities to the utmost. The following series of tables computed from the monthly returns to the Interstate Commerce Commission presents the income account of the railways for the calendar year 1915 in comparison with other years. In the column for 1915, the reader can trace for himself the amazing transformation that came over the earnings of the railways almost co-incident with the close of the fiscal year, the statistics of which form the subject of the body of this report. He will perceive that the total for the first six months of 1915 compared with that for the corresponding half year of 1914 gave no inkling of the gratifying revival in revenue that was to follow. The first table gives the gross operating revenues by months for selected years since 1907.

SUMMARY OF GROSS OPERATING REVENUES OF THE RAILWAYS OF THE UNITED STATES DURING THE CALENDAR YEARS 1907 TO 1915 (OMITTING 1909, 1911 AND 1912), BY MONTHS AND HALF-YEARS.

	1907	1908	1910	1913	1914	1915
Average Mileage..	227,000 (000)	231,584 (000)	239,543 (000)	252,209 (000)	255,274 (000)	257,375
January.....	\$ 199,000	\$ 173,611	\$ 211,041	\$ 251,290	\$ 234,789	\$ 221,850,633
February.....	178,300	161,085	202,825	234,036	210,342	212,441,442
March.....	211,700	183,509	238,725	250,310	251,063	239,771,234
April.....	214,800	175,071	225,856	246,482	238,846	239,251,611
May.....	224,800	174,527	235,134	266,278	240,953	246,480,414
June.....	223,000	184,047	237,988	263,241	252,925	258,404,404
Half Year.....	\$1,251,800	\$1,051,853	\$1,351,570	\$1,511,638	\$1,428,948	\$1,418,199,738
July.....	\$ 228,672	\$ 195,245	\$ 230,615	\$ 270,074	*\$ 262,871	\$ 267,764,229
August.....	241,303	206,877	254,005	283,467	274,214	282,036,440
September.....	234,386	219,013	256,647	287,566	276,778	296,637,840
October.....	250,575	233,105	263,464	301,084	273,915	313,711,751
November.....	220,445	211,281	243,559	271,030	240,054	307,658,188
December.....	194,304	205,455	236,835	256,319	232,360	258,407,780
Half Year.....	\$1,369,688	\$1,270,978	\$1,490,128	\$1,669,539	\$1,560,192	\$1,764,216,228
Total.....	\$2,621,288	\$2,322,831	\$2,841,699	\$3,181,177	\$2,989,140	\$3,182,415,966
Decrease from Preceding Year.....		\$298,457			*\$192,037,201	
Increase Over Preceding Year.....			\$234,470	\$145,102		*\$193,275,859
Revenue per mile of line.....	\$11,547	\$10,034	\$11,865	\$12,613	\$11,710	\$12,365

Note.—Operating revenues, 1909, \$2,607,228,000; revenue per mile of line, \$11,099.

Operating revenues, 1911, \$2,819,222,000; revenue per mile of line, \$11,527.

Operating revenues, 1912, \$3,036,076,000; revenue per mile of line, \$12,242.

*Beginning July, 1914, figures include "Auxiliary Operations, Revenues," adding about \$5,000,000 per month. For this reason gross is not properly comparable with previous years except with this correction. Net revenues, however, are nearly comparable.

Owing to the fact mentioned in the above footnote, the total revenues from operation for the calendar year 1915 (\$3,182,415,966), which appears to be a high record, were still some \$60,000,000 below those of 1913.

**SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS OF THE
UNITED STATES FOR THE CALENDAR YEARS 1907 TO 1915 (OMIT-
TING 1909, 1911 AND 1912), BY MONTHS AND HALF-YEARS.**

	1907 (000)	1908 (000)	1910 (000)	1913 (000)	1914 (000)	1915	Ratio to Revenues (1915)
January.....	\$ 134,225	\$ 132,502	\$ 153,631	\$ 188,703	\$ 181,812	\$ 170,096,823	76.66
February.....	121,500	123,773	145,849	174,356	170,713	161,021,294	75.79
March.....	142,425	128,200	160,402	185,232	183,316	171,096,992	71.35
April.....	144,990	124,284	159,130	186,094	178,868	171,511,616	71.60
May.....	151,740	123,932	163,361	192,599	182,812	174,076,538	70.65
June.....	150,525	124,208	160,814	185,585	180,507	173,606,681	67.18
Half Year.....	\$ 845,405	\$ 756,902	\$ 943,190	\$1,109,567	\$1,078,028	\$1,021,408,944	72.02
Ratio.....	67.7%	72%	69.78%	73.40%	75.44%		
July.....	\$ 152,992	\$ 127,978	\$ 157,458	\$ 189,700	*\$ 183,967	\$ 178,154,197	66.53
August.....	156,837	131,557	164,488	193,721	184,585	181,636,657	64.40
September.....	156,631	137,155	165,067	193,906	183,330	183,985,014	62.02
October.....	166,999	144,195	169,852	202,864	184,714	193,760,145	61.76
November.....	154,150	136,809	164,636	192,420	172,042	189,697,461	61.59
December.....	142,631	136,867	166,478	187,026	171,281	190,315,976	64.21
Half Year.....	\$ 930,242	\$ 814,563	\$ 967,979	\$1,159,637	\$1,079,919	\$1,117,349,450	63.33
Ratio.....	68%	64.1%	66.10%	69.46%	69.92%		
Total.....	\$1,775,647	\$1,571,465	\$1,931,172	\$2,269,204	\$2,157,947	\$2,138,758,394	67.20
Ratio.....	67.8%	67.7%	67.98%	71.33%	72.19%		
Decrease from Preceding Year.....		\$204,182			*\$112,258	*\$19,182,662	
Increase over Preceding Year.....			\$226,881	\$176,908			
Expenses per Mile.....	\$7.822	\$6.786	\$8.068	\$8.998	\$8.453	\$8.310	

Note.—Operating expenses, 1909, \$1,704,290,000; ratio to revenues, 65.37%; expenses per mile of line, \$7.255.

Operating expenses, 1911, \$1,930,103,000; ratio to revenues, 68.58%; expenses per mile of line, \$7.906.

Operating expenses, 1912, \$2,092,237,000; ratio to revenues, 68.91%; expenses per mile of line, \$8.436.

*Beginning July, 1914, figures include "Auxiliary Operations, Expenses," adding about \$5,000,000 per month, as in revenues. For this reason, expenses are not properly comparable with previous years, except with this correction. Net revenues, however, are nearly comparable.

Compared with 1913 on the same basis the operating expenses for 1915 would show a decrease of approximately \$191,446,000, which is the measure of the economies forced on the railways by rate reductions in the face of advancing wages—for be it remembered the railways carried more passengers and freight in 1915 than they did in 1913.

SUMMARY OF NET OPERATING REVENUES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1907 TO 1915 (OMITTING 1909, 1911 AND 1912), BY MONTHS AND HALF-YEARS.

	1907 (000)	1908 (000)	1910 (000)	1913 (000)	*1914 (000)	1915
January.....	\$ 64,775	\$ 41,108	\$ 57,409	\$ 65,587	\$ 52,555	\$ 51,753,810
February.....	56,800	37,311	56,976	59,679	39,079	51,420,148
March.....	69,275	55,309	78,322	66,081	67,312	68,674,242
April.....	69,810	50,787	66,725	60,388	59,840	67,739,995
May.....	73,060	50,594	71,772	73,679	57,955	72,403,876
June.....	72,475	59,838	77,173	77,656	72,364	84,798,723
Half Year.....	\$406,195	\$294,951	\$408,380	\$402,071	\$349,105	\$396,790,794
July.....	75,679	67,267	73,157	80,373	78,904	89,610,032
August.....	84,465	75,319	89,517	89,747	89,629	100,399,783
September.....	77,755	81,858	91,580	93,660	93,448	112,652,526
October.....	83,576	88,909	93,612	98,219	89,201	119,951,606
November.....	66,294	74,472	83,922	78,610	68,012	118,160,727
December.....	51,673	68,587	70,357	69,293	61,080	106,091,804
Half Year.....	\$439,445	\$456,414	\$502,146	\$509,902	\$480,274	\$646,866,778
Twelve Months....	845,640	751,365	910,527	911,973	829,379	\$1,043,657,572
Taxes.....	83,156	86,872	109,560	135,321	141,758	143,997,257
Net Operating Income.....	\$762,484	\$664,492	\$800,966	\$776,651	\$687,621	\$899,660,315
Per Mile of Line....	3,359	2,869	3,344	3,080	2,694	3,494
Net Capital per Mile.....	\$58,298	\$57,201	\$62,657	\$65,861	\$66,661	\$67,000
Rate of Income to Net Capital....	5.76%	5.02%	5.34%	4.69%	4.04%	5.21%

Note.—Net operating income, 1909, \$808,173,000; taxes, \$94,664,000; net operating income per mile of line, \$3,441; net return on capital, 5.80%.

Net operating income, 1911, \$771,738,000; taxes, \$115,562,000; net operating income per mile of line, \$3,161; net return on capital, 4.94%.

Net operating income, 1912, \$818,026,000; taxes, \$125,753,000; net operating income per mile of line, \$3,299; net return on capital, 5.19%.

*Deficits from outside operations (auxiliary) deducted in first six months of 1914 to conform with new system in second half. See notes to previous tables.

In this table the changes in classification play an inconspicuous part because the figures for outside operations in revenues and expenses practically offset each other.

In the next statement the data given in the preceding pages is assembled into an informal income account for the railways, by calendar years, more in detail and some of the recent innovations are indicated.

STATEMENT OF OPERATING RECEIPTS AND EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1911 TO 1915 WITH RATIOS.

Item	1911	1912	1913	1914	1915
Average Miles Operated.....	244,128 (000)	248,008 (000)	252,300 (000)	255,274 (000)	257,375
Operating Revenues from:					
Freight.....	\$1,920,065	\$2,111,241	\$2,202,000	\$2,053,690	\$2,220,151,781
Per Cent of Earnings.....	68.25	69.54	69.28	68.71	69.76
Passengers.....	661,276	661,303	716,174	670,732	667,120,190
Per Cent of Earnings.....	23.51	22.44	22.51	22.44	20.94
Mail.....	Included	Included	Included	Included	60,428,044
Per Cent of Earnings.....	in	in	in	in	1.90
Express.....	"Other	"Other	"Other	"Other	75,229,321
Per Cent of Earnings.....	Transp."	Transp."	Transp."	Transp."	2.38
Other Transportation Revenue.....	203,425	211,231	224,930	214,872	91,812,180
Per Cent of Earnings.....	7.23	8.96	7.07	7.19	2.89
(a) Incidental (Non-transp.).....	23,824	22,400	26,204	49,656	(a) 67,663,850
Per Cent of Earnings.....	1.01	1.06	1.14	1.66	2.13
Total Operating Revenues.....	\$2,814,222	\$3,036,076	\$3,181,177	\$2,989,140	\$3,183,415,906
Operating Expenses:					
Maintenance of Way and Structures.....	\$ 367,020	\$ 398,253	\$ 428,110	\$ 398,737	\$ 395,316,123
Ratio to Revenue.....	13.04	12.82	13.77	13.34	12.42
Maintenance of Equipment.....	436,500	487,893	543,843	523,100	526,293,767
Ratio to Revenue.....	15.40	16.07	17.10	17.50	16.54
Traffic Expenses.....	59,321	62,352	65,531	61,446	61,520,629
Ratio to Revenue.....	2.11	2.05	2.06	2.05	1.93
Transportation.....	995,926	1,079,313	1,142,294	1,086,116	1,058,314,363
Ratio to Revenue.....	35.39	35.55	35.91	36.34	33.26
General Expenses.....	74,322	73,943	79,425	80,077	79,332,612
Ratio to Revenue.....	2.64	2.42	2.49	2.68	2.49
Miscellaneous.....	12			8,471	17,980,901
Ratio to Revenue.....				0.28	0.56
Total Operating Expenses.....	\$1,930,103	\$2,092,297	\$2,269,204	\$2,157,947	\$2,138,758,394
Ratio.....	68.58	68.91	71.33	72.19	67.20
(b) Profit from Outside Operations.....	2,272	1,710	*1,062	†*1,814	(b) Included above
Net Revenues.....	\$586,391	\$945,489	\$910,910	\$829,379	\$1,043,657,572
Taxes.....	\$115,561	\$125,753	\$135,321	\$141,758	\$ 143,997,357
Ratio to Gross Earnings.....	4.10	4.14	4.25	4.74	4.53
Net Operating Income.....	\$770,830	\$819,736	\$775,588	\$687,621	\$ 899,660,315
Ratio to Earnings.....	27.39	27.00	24.38	23.07	28.27
Per Mile of Line.....	\$3,157	\$3,305	\$3,075	\$2,694	\$3,494

*Deficit.

†For first six months; last six months included above. See (b).

(a) Present "Incidental" formerly was largely "Non-Transportation" and "Outside" or "Auxiliary Operations."

(b) Since July, 1914, revenues and expenses from "Outside Operations" included in Operating Revenues and Operating Expenses.

Where in our review last year we said there was "little in the income accounts of American railways (for the calendar year 1914) to indicate that they were peculiarly affected by the European war," the reverse was the case in 1915, as evidenced in the foregoing tables. The increase in railway revenues in the spring of 1915 was co-incident with the beginning of shipments of war munitions and other manufactures in considerable quantities to Europe. As American factories became more active on increasing war orders, the traffic of American railways carrying coal and raw materials to those factories and the manufactured products from them increased proportionately. To this source of revenue must be added that from the transportation of an exceptional grain crop. The remarkable co-incidence between our export trade and railway revenues during the second half of 1915 is shown in the following statement:

1915	Exports	Railway Revenues
July.....	\$268,974,610	\$267,764,229
August.....	261,025,230	282,036,440
September.....	300,676,822	296,637,840
October.....	328,030,281	313,711,751
November.....	331,144,527	307,658,188
December.....	359,306,492	296,407,780

Actually the coincidence between these columns is closer than here appears, because normally railway revenues fall off from 25 to 50 millions between October and December.

While the European war has had the effect of alleviating the railway situation in the United States, it has not cured any of the ills with which that situation is afflicted. What the railways shall receive for services they must render is at the mercy of the Commission or of the Post Office Department, while what they shall pay for the services of their employes is settled under duress or an arbitration invoked to avoid the national calamity of a universal railway strike.

THE RAILWAYS OF EUROPE IN 1915.

On the continent of Europe the question of transportation is scarcely secondary to those of men, munitions and supplies, and in every country reports agree that roadbeds and equipment are showing the strain of tremendous traffic and inadequate maintenance.

From the railway point of view, the opening of the road between Berlin and Constantinople by the Teutonic allies and the construction of the Petrograd-Ekaterina line from Archangel to the latter open port were the events of the first importance. The Constantinople line was open for through traffic on January 15, 1916, trains running through from Berlin and return twice a week, making the distance of 1,521 miles in sixty hours. From Vienna to Constantinople the distances and fares are as follows:

Vienna to	Distance	FARE	
		First Class	Second Class
Belgrade.....	395 miles	\$14.45	\$ 9.33
Nish.....	546 "	23.04	15.09
Sofia.....	646 "	29.25	19.22
Constantinople.....	1,053 "	53.25	35.20

It takes 48 hours for the trip from Vienna to Constantinople, and first class passengers may use a sleeping car, paying 16 marks (\$3.64) per bed per night extra. One traveler wishing to reserve a sleeping compartment with an upper and under bed for himself must buy two first class tickets and pay the price of two beds, or \$121.06, for what would cost about \$32.00 in a Pullman sleeper here.

The railway from Petrograd to Ekaterina, or Kola, a distance of about 675 miles, was within some 35 miles of completion at latest accounts and a reindeer service provides a temporary connection. Although about 300 miles northwest of Archangel and well within the Arctic circle, Ekaterina is free of ice all the year round, being under the moderating influence of the Gulf Stream. This line was projected before the war, but has recently been pushed with the aid of British and Canadian contractors.

The fate of the Bagdad railway, connecting Constantinople with the Persian Gulf, will be settled on the battlefields of Europe rather than in the valleys of the Tigris and Euphrates.

While the railways of Germany have not suffered directly from the destructive causes that have laid waste the war zones, correspondents agree that everywhere they show the wear and tear of hard usage without timely and sufficient repairs and replacements. Of this phase of the situation the European correspondent of the *Railway Age-Gazette* writes:

"In war time not only is railway equipment used more extensively, but it is not kept in good repair. There is a spirit of

waste and hurry, an idea of makeshift, and an inclination or a necessity to force material in need of repair to do work notwithstanding. These tendencies show themselves not only in the war zones but hundreds of miles behind the lines."

These conditions and tendencies are observable on British railways as well as on those of Germany, France and other continental countries. In the war zones the destruction of railway bridges and permanent (?) way is a part of every advance and retreat and their repair is of the most hasty and temporary character.

Here is a picture of the situation in Germany from the pen of "A Neutral": "The railway stations are gloomy all the way from the frontier to the German capital. Here and there one can only see small groups of soldiers and their war equipment. There are no porters to be seen at the stations, and the traveler is obliged to attend to his own luggage. All trains are militarized and very often passengers are requested to leave the carriages and wait for the next train. Owing to the scarcity of men so noticeable in Germany, trains run with long delays. Rolling stock and other material is very poor. Restaurants and refreshment rooms at the stations are now closed and very few trains carry sleeping cars and dining cars. Along the railway line one can see numerous munition factories working day and night. Workers are getting from 10 to 15 marks (\$2.40 to \$3.60) per day." Owing to the advance in the cost of living the purchasing power of the mark is about one-half what it was before the war.

One of the effects of the shortage of materials due to the blockade of Germany has been the substitutions made in the railway industry, such as metallic hose for the rubber hose connections between the cars of trains and a satisfactory substitute for the coal tar oil for lubricating the journals of rolling stock produced by a special process from anthracene. The former are said to withstand a pressure of 25 atmospheres, or 350 pounds, and the latter has the advantage of being extremely cheap as well as capable of "various degrees of viscosity according to the purpose for which it is to be used."

In Austria-Hungary there is a shortage of workmen in the locomotive shops, many of which are busy making munitions of war instead of locomotives. As a consequence, an order given by the

Austrian government for 150 engines to be delivered in 1915 has as yet been only partially filled.

In Great Britain there are complaints that civil traffic on the railways is unnecessarily subordinated to the movement of troops and supplies. Eight of the principal companies showed a reduction of \$1,380,000 in dividends in 1915, compared with the preceding year; thirteen paid the same, and five paid increases amounting to \$535,000, leaving a net decrease in dividends for 1915 of \$845,000.

Statistically speaking, the returns from all European countries, even for the year preceding the war, are very incomplete.

THE BUREAU'S STATISTICS FOR 1915.

Owing to the numerous innovations in the form and substance of the official returns, already mentioned, this Bureau has to present its statistics with the same warning that accompanies the official advance bulletins, to-wit: "Because of changes in accounting, classifications, consolidations of companies, etc., comparative averages are approximate only." To which we would add that the same is applicable to many of the aggregates.

Bearing this in mind the Bureau submits its annual report of the Railways of the United States for the year ended June 30, 1915, with the assurance that its statements, averages and comparisons are as nearly accurate as careful compilation and supervision can make them. The report covers the operation of 448 companies, operating 247,312 miles of line and 379,638 miles of track, an increase of 1,418 and 3,311 miles respectively over that covered by the report for the preceding year. It represents about 97% of the mileage and fully 98% of the total traffic of the railways of the United States.

Owing to the war, that portion of the report devoted to foreign railways has not been brought down as near to date as could be wished. So far as they go, the railway statistics of the principal countries of the world are tabulated from the latest official statistics available.

As in previous issues, the Interstate Commerce Commission is referred to herein as the "Commission," its annual "Statistics of Railways in the United States" as "Official Statistics," and "the year

ended June 30th" is implied before the year named unless otherwise specified.

This report, now more than ever the sole compilation of continuous data respecting the railways of the United States, is made possible by the continued courtesy of the accounting officials of the reporting roads. The public has little idea of the onerous nature of the demands made on these officials by federal and state authorities. Besides the monthly reports on casualties, rail and industrial, and on income, the detail of which is constantly increased, and the annual report, now a book of over 100 pages, inquiring into the most minute and elusive particulars of railway organization, financing and operation, most of which has to be duplicated to every commission and utility board of the states in which the companies own or operate railways, the accounting officials are constantly called on for special reports for the information of the authorities or for use in the thousand and one railway hearings, conferences and arbitrations that go on as unceasingly as Tennyson's brook. For adding his mite to the mere physical burden of these demands, the writer makes his annual apologies, together with his sincerest appreciation of the universal courtesy that honors his requests.

Acknowledgments are also due to Mr. Francis A. Bonner, associate director of the Bureau, for his work through the year, and assistance in the preparation of this report, especially in the preparation of the tables of foreign railways.

SLASON THOMPSON.

Chicago, April 22, 1916.

I

MILEAGE OF STEAM RAILWAYS IN 1915

The operated mileage of the privately owned, government controlled railways of the United States on June 30, 1915, was approximately 266,000 miles. Of the total, however, nearly 2,000 miles lie in Canada and 11,500 were operated under trackage rights. This would leave the physical mileage of American railways, so-called, about 252,500. In round figures the Interstate Commerce Commission classifies the operated mileage as follows:

Class I (yearly revenues \$1,000,000 or over).....	229,000
Class II (" " between \$1,000,000 and \$100,000).....	20,000
Class III (" " under \$100,000).....	8,500
Not filing reports.....	8,500
Total.....	266,000

Reports to this Bureau for the year 1915 from 448 companies cover 247,312 miles, of which 1,913 were in Canada and 52 in Mexico. How the operated mileage covered by this report compares with the figures of the Commission's latest report is shown by the following table, which includes the mileage of all auxiliary tracks:

	1915 Bureau	1914 Bureau	1914 Official	1913 Official
Single track.....	247,312	245,894	256,547	253,470
Second track.....	28,675	27,644	27,609	26,274
Third track.....	2,735	2,721	2,666	2,589
Fourth and other main tracks..	2,456	1,922	2,071	1,964
Yard tracks and sidings.....	98,166	97,852	98,285	95,211
Total all tracks.....	379,344	376,033	387,208	379,508

The detail of this table proves that, so far as auxiliary tracks are concerned, the reports to this Bureau are practically complete. This accounts for the fact that while this report covers about 97% of the operated mileage of the country, its summaries deal with over 98% of the total traffic.

Of the 247,312 miles of line reported to this Bureau, 10,709 miles were operated under trackage rights, leaving 236,603 as the net physical mileage represented. As the rental for the mileage operated under trackage agreements is represented in the capital, the full operated mileage is used as the divisor in all assignments.

The first summary under this table presents the operated mileage reported to this Bureau in 1915 and 1914 by states, in comparison with the official figures of mileage owned in 1914, with relation to area and population:

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES, BY STATES,
FOR THE YEARS ENDING JUNE 30, 1915 AND 1914, AND ITS RELATION TO AREA AND POPULATION.

State	Bureau's Figures		Commission's Figures		Population per Mile of Line 1914
	1915 Miles Operated	1914 Miles Operated	1914 Miles Owned	Miles of Line per 100 Sq. Miles	
Alabama.....	5,187	5,189	5,406	10.54	419
Arizona.....	2,121	2,096	2,273	2.00	104
Arkansas.....	4,575	4,578	5,335	10.16	315
California.....	7,398	7,288	8,368	5.38	327
Colorado.....	5,699	5,818	5,739	5.54	157
Connecticut.....	993	991	999	20.73	1,199
Delaware.....	340	340	335	17.04	625
Florida.....	4,348	4,221	5,120	9.33	164
Georgia.....	6,972	6,917	7,433	12.66	372
Idaho.....	2,504	2,646	2,749	3.30	142
Illinois.....	13,256	13,188	12,140	21.66	491
Indiana.....	7,661	7,667	7,476	20.74	371
Iowa.....	10,151	10,138	9,994	17.98	222
Kansas.....	9,445	9,443	9,257	11.32	192
Kentucky.....	3,761	3,777	3,780	9.41	621
Louisiana.....	4,913	4,841	5,720	12.60	309
Maine.....	2,342	2,276	2,270	7.59	335
Maryland.....	1,356	1,350	1,430	14.38	936
Massachusetts.....	2,116	2,116	2,130	26.50	1,686
Michigan.....	8,546	8,254	8,934	15.54	332
Minnesota.....	8,968	9,079	9,040	11.18	244
Mississippi.....	3,968	3,973	4,441	9.58	427
Missouri.....	8,415	8,387	8,224	11.97	410
Montana.....	4,852	4,896	4,847	3.32	88
Nebraska.....	6,259	6,260	6,171	8.03	202
Nevada.....	2,041	2,208	2,418	2.20	40
New Hampshire.....	1,248	1,248	1,256	13.91	349
New Jersey.....	2,386	2,379	2,313	30.78	1,211
New Mexico.....	3,026	2,894	3,025	2.47	126
New York.....	8,457	8,452	8,530	17.90	1,155
North Carolina.....	4,640	4,626	5,419	11.12	430
North Dakota.....	5,058	4,998	5,160	7.35	132
Ohio.....	9,426	9,536	9,148	22.45	548
Oklahoma.....	6,379	6,323	6,398	9.22	313
Oregon.....	2,555	2,432	2,912	3.05	267
Pennsylvania.....	11,689	11,545	11,634	25.95	706
Rhode Island.....	195	196	206	19.27	2,857
South Carolina.....	3,516	3,231	3,687	12.09	430
South Dakota.....	3,941	4,014	4,238	5.51	155
Tennessee.....	3,837	3,729	4,106	9.85	548
Texas.....	15,706	15,359	15,758	6.01	269
Utah.....	1,970	2,007	2,098	2.55	196
Vermont.....	979	979	1,073	11.76	337
Virginia.....	4,303	4,339	4,611	11.45	465
Washington.....	5,552	5,223	5,247	7.85	265
West Virginia.....	3,269	3,129	3,915	16.30	339
Wisconsin.....	7,362	7,389	7,611	13.77	326
Wyoming.....	1,615	1,615	1,821	1.87	2
Dist. of Columbia.....	51	51	36	60.38	9,709
Canada (a).....	1,913	1,941	.....	.....	.....
Mexico (a).....	52	52	.....	.....	.....
United States.....	247,312	245,572	252,231	8.48	(b) 39

(a) Mileage operated in Canada and Mexico by American roads.

(b) On basis 98,372,266 population in 1914.

© Omits 270 miles not distributed by states.

Wherever the ratio of miles per 100 square miles of territory falls below ten in the preceding table, there is presumptive need for more railways; and wherever the population per mile falls below 300, transportation facilities have been provided in advance of traffic.

This report takes only incidental notice of non-operating railway companies, which, in the language of the Official Statistician, "maintain their existence merely for the purpose of receiving and disbursing rentals paid by lessee roads."

The relation of railway mileage to area and population in the United States since 1890 is shown in the next summary:

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES, 1915 TO 1890, AND ITS RELATION TO AREA AND POPULATION.

Year Ending June 30	Population (Official) (a)	Miles of Line Owned (b)	Miles of Line per 100 Sq. Miles of Territory	Inhabitants per Mile of Line
1915.....	100,725,000	253,181	8.51	397
1914.....	99,027,000	252,231	8.48	392
1913.....	97,337,000	249,803	8.40	389
1912.....	95,656,000	246,816	8.30	386
1911.....	93,983,000	244,180	8.21	383
1910.....	91,972,266	240,438	8.06	382
1909.....	90,556,521	236,868	7.98	382
1908.....	88,938,527	230,494	7.87	378
1907.....	87,320,533	227,671	7.74	370
1906.....	85,702,539	222,575	7.55	373
1905.....	84,064,545	217,018	7.34	378
1904.....	82,466,551	212,577	7.20	379
1903.....	80,848,557	207,187	7.00	384
1902.....	79,230,563	201,673	6.82	388
1901.....	77,612,569	196,075	6.64	391
1900.....	75,994,575	192,941	6.51	393
1899.....	74,318,000	188,277	6.37	395
1898.....	72,947,000	185,371	6.28	394
1897.....	71,592,000	182,920	6.21	390
1896.....	70,254,000	181,154	6.15	384
1895.....	68,934,000	179,179	6.08	382
1894.....	67,632,000	176,803	6.02	379
1893.....	66,349,000	170,332	5.94	377
1892.....	65,086,000	165,691	5.78	380
1891.....	63,844,000	164,603	5.67	380
1890.....	62,947,714	159,272	5.51	384

(a) For other than census years prior to 1900, and since 1910, the figures of population represent the estimates of the Actuary of the Treasury; between 1900 and 1910 they are estimates of the Bureau of the Census. Land area of the United States, 2,973,890 square miles.

(b) Exclusive of Canadian mileage usually included in "operated" mileage for United States

It will be observed that the ratio of population to railway mileage is approaching the 400 per mile of line. This reflects the pause in railway construction. The ratio with reference to area should be compared with the European ratio on a subsequent page.

The next summary divides the mileage of the railways according to the territorial groups established by Prof. Henry C. Adams, as official statistician, in 1890 and continued down to 1910. The substitution of three districts for these ten groupings in 1911 and dividing the railways into three classes along arbitrary revenue lines was an unfortunate innovation. In response to the recommendation of this Bureau, the official statistics for 1914 include the more salient figures for Class III roads.

SUMMARY OF RAILWAY MILEAGE ACCORDING TO ASSIGNMENTS FOR OPERATION BY GROUPS, 1915, 1914, AND 1910.

Territory Covered	Mileage on June 30			
	1915 Bureau	1914 Bureau	1910 Official	1914 Official
Group I.....	7,889	7,822	8,122	} No data
Group II.....	25,020	22,604	23,815	
Group III.....	23,727	25,989	26,172	
Eastern Division.....	56,636	56,415	58,109	64,941
Group IV.....	15,708	15,364	13,966	} No data
Group V.....	31,438	31,080	27,976	
Southern Division.....	47,146	46,444	41,942	49,670
Group VI.....	56,025	55,826	51,830	} No data
Group VII.....	12,136	12,730	13,935	
Group VIII.....	33,818	32,775	33,987	
Group IX.....	16,683	17,169	18,375	
Group X.....	24,868	24,535	22,653	
Western Division.....	143,530	143,035	140,780	141,936
United States.....	247,312	245,894	240,831	256,547

Note.—The bureau divisions for 1915 and 1914 for Groups II and III are not comparable because of consolidation of New York Central Lines.

The preservation of these ten territorial groupings is advisable, if for no other reason than that they indicate the territorial divisions into which the country must eventually be divided for regulation purposes, with Interstate Commerce Commissioners appointed for each division and only sitting in banc in Washington to decide appeals. Regulation by 45 varieties of examiners helps out the Commission, but it does not afford a satisfactory alternative for hearings by the Commission.

According to the *Railway Age-Gazette*, only 898 miles of main track and 420 miles of auxiliary track, exclusive of yard tracks and sidings, were laid in the United States in the calendar year 1915. Compared with the construction in 1914 this was distributed among the states as follows:

SUMMARY SHOWING MILEAGE OF RAILWAYS BUILT IN THE UNITED STATES IN THE CALENDAR YEARS 1915 AND 1914, CLASSIFIED BY STATES.

State	Miles Built 1915	Miles Built 1914	State	Miles Built 1915	Miles Built 1914
Alabama.....	53.15	1.00	Nebraska.....	1.25	.88
Arizona.....	50.00		Nevada.....	7.00	10.01
Arkansas.....	19.00	27.10	New Hampshire.....		
California.....	32.00	103.91	New Jersey.....	.66	.80
Colorado.....	4.73		New Mexico.....	3.66	29.47
Delaware.....		1.15	New York.....	2.84	10.45
Florida.....	38.65	220.46	North Carolina.....	33.30	34.00
Georgia.....	31.64	14.66	North Dakota.....	26.29	63.24
Idaho.....		117.22	Ohio.....	9.30	17.05
Illinois.....	6.90	3.17	Oklahoma.....	34.74	4.00
Indiana.....		12.80	Oregon.....	82.70	90.42
Iowa.....		26.16	Pennsylvania.....	98.37	62.74
Kansas.....	58.56	11.00	South Carolina.....		66.60
Kentucky.....	48.89	31.57	South Dakota.....		41.30
Louisiana.....		7.79	Tennessee.....	12.15	11.21
Maine.....	1.33	.31	Texas.....	4.40	50.86
Maryland.....	3.40		Utah.....	14.95	41.95
Massachusetts.....	2.00		Vermont.....		
Michigan.....	18.50	18.81	Virginia.....	17.80	66.05
Minnesota.....	46.76	8.42	Washington.....	70.88	142.73
Mississippi.....	3.50	19.15	West Virginia.....	13.78	19.80
Missouri.....	.16	4.23	Wisconsin.....	29.32	29.78
Montana.....	8.51	48.13	Wyoming.....	7.37	61.43
Total.....			(a) 898.44	1,531.80	
Auxiliary Track.....			420.98	595.42	
Total All Tracks.....			(a) 1,319.42	2,127.12	

(a) Exclusive of 34.80 miles built in Alaska, 1915.

During the same periods 718 and 1,978 miles were added to the railways of Canada. The new construction in the United States in 1915 was the smallest in fifty years and, in connection with the almost complete suspension of building auxiliary track, emphasized in marked degree the paralyzing effect of the industrial depression of 1915.

How insignificant was the railway construction in 1915 may be judged from the following table of mileage built since 1893. There were less than two-thirds as many miles built in 1915 as in 1895,

when all business in the United States was still prostrate after the pause of 1893:

CONSTRUCTION BY YEARS SINCE 1893.

	Miles Built		Miles Built
1893.....	3,024	1905.....	4,388
1894.....	1,760	1906.....	5,623
1895.....	1,428	1907.....	5,212
1896.....	1,692	1908.....	3,214
1897.....	2,109	1909.....	3,748
1898.....	3,265	1910.....	4,122
1899.....	4,569	1911.....	3,066
1900.....	4,894	1912.....	2,997
1901.....	5,368	1913.....	3,071
1902.....	6,026	1914.....	1,532
1903.....	5,652	1915.....	(a) 933
1904.....	3,832		
		Total, 23 years.....	81,525

(a) Includes 34.80 miles in Alaska.

During the fiscal year 1914-1915, according to the returns to this Bureau, 1,388 miles of new line were built, against 1,790 for the preceding year. These figures do not always tally with those gathered by the railway journals.

MILEAGE OF ALL TRACKS.

What provision the railways of the United States have made to handle the traffic of a nation of over 102,000,000 souls is effectively set forth in the following statement, which gives the mileage of all tracks by years since 1890:

**SUMMARY OF MILEAGE OF SINGLE TRACK, SECOND, THIRD AND
FOURTH TRACK AND YARD TRACK AND SIDINGS IN THE UNITED
STATES, 1890 TO 1915.**

Year Covered	Single Track Miles	Second Track Miles	Third Track Miles	Fourth and Other Track Miles	Yard Tracks and Sidings Miles	Total All Tracks Miles
1915 Bureau.....	247,212	28,675	2,735	2,456	96,166	379,344
1914 Official.....	*256,547	27,609	2,696	2,071	96,285	387,208
1913 ".....	*253,470	26,374	2,589	1,964	96,211	379,508
1912 ".....	*249,852	24,963	2,512	1,908	92,019	371,238
1911 ".....	*246,338	23,461	2,414	1,747	88,974	362,824
1910 ".....	*240,831	21,669	2,306	1,489	85,581	351,767
1909 ".....	*235,402	20,949	2,169	1,453	82,376	342,351
1908 ".....	*230,494	20,209	2,081	1,409	79,452	333,646
1907 ".....	227,455	19,421	1,960	1,390	77,749	327,975
1906 ".....	222,340	17,936	1,766	1,379	73,760	317,083
1905 ".....	216,973	17,066	1,809	1,215	66,941	306,796
1904 ".....	212,243	15,824	1,467	1,046	66,492	297,073
1903 ".....	205,313	14,661	1,308	963	61,560	283,821
1902 ".....	200,184	13,720	1,304	895	58,220	274,196
1901 ".....	196,562	12,845	1,153	876	54,914	266,362
1900 ".....	192,556	12,151	1,094	829	52,153	258,784
1899 ".....	187,535	11,546	1,047	790	49,223	250,143
1898 ".....	184,648	11,293	1,009	793	47,589	245,334
1897 ".....	183,284	11,018	995	780	45,934	242,013
1896 ".....	181,963	10,685	990	764	44,718	239,140
1895 ".....	177,746	10,640	975	733	43,182	233,276
1894 ".....	175,691	10,499	953	711	41,942	229,796
1893 ".....	169,780	10,051	913	669	40,451	221,864
1892 ".....	162,397	9,367	853	626	37,808	211,051
1891 ".....	161,275	8,866	813	750	35,742	207,446
1890 ".....	156,404	8,438	761	562	33,711	199,876

*Since 1903 the official mileage is exclusive of switching and terminal companies.

MILEAGE OF SWITCHING AND TERMINAL ROADS.

The mileage of these companies has been as follows:

Year	Main Line	Yard Track and Sidings	Total
1908.....	1,624	2,085	3,709
1909.....	1,623	2,384	4,007
1910.....	1,614	2,270	3,884
1911.....	1,796	3,171	4,967
1912.....	1,807	3,262	5,069
1913.....	1,911	3,462	5,373
1914.....	2,017	3,636	5,653

To give an adequate idea of the vast extent of the auxiliary tracks of American railways, it may be stated that the yard tracks and sidings alone equal the main line mileage of Germany, Great Britain and France, with those of Belgium thrown in.

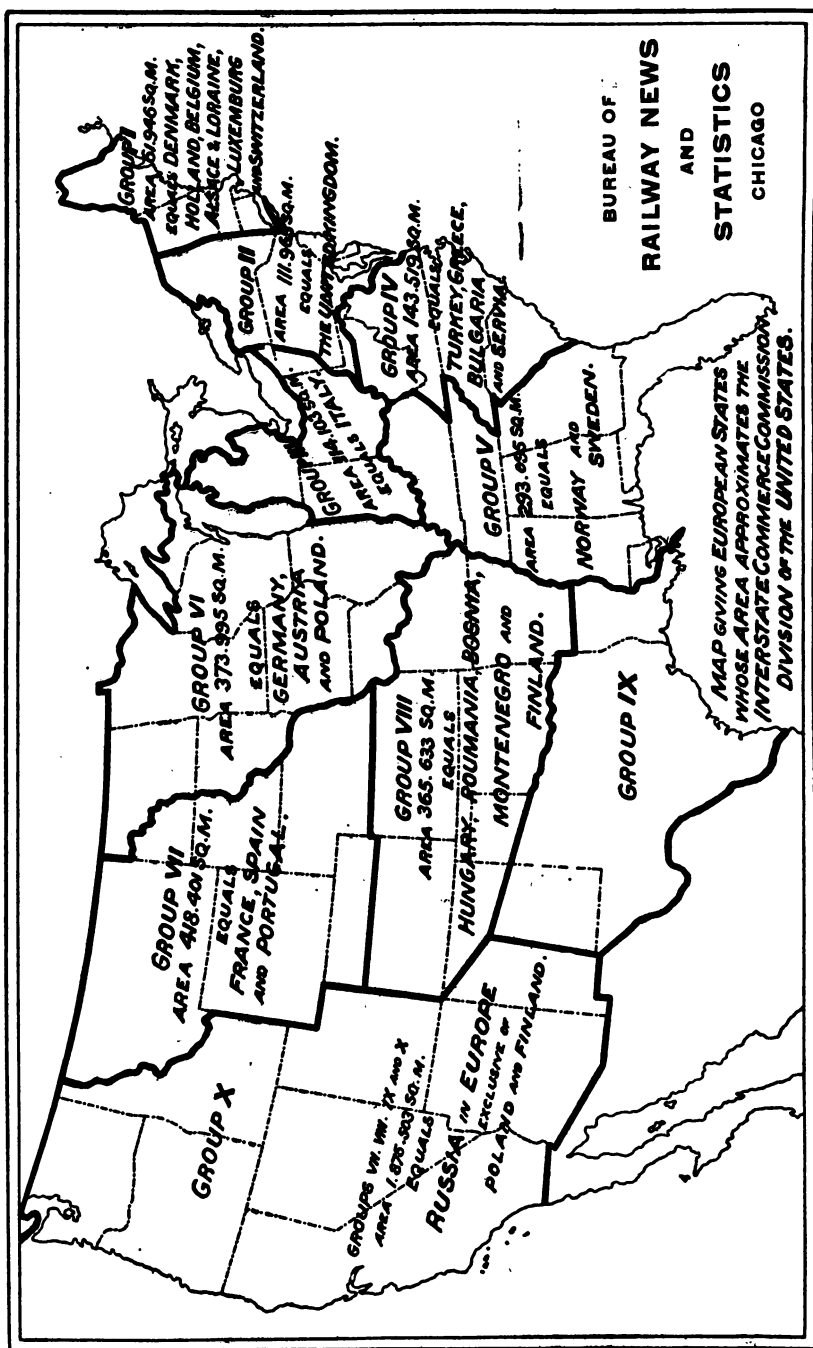
DISTRIBUTION OF RAILWAY TRACK BY GROUPS.

How the 379,344 miles of track in 1915 was distributed among the Commission's territorial groups as compared with 1890, when such assignment was first made, is shown in the next summary:

SUMMARY OF MILEAGE, BY GROUPS, SHOWING LENGTH OF SINGLE TRACK, SECOND, THIRD AND FOURTH TRACKS, YARD TRACK AND SIDINGS, 1890 TO 1915.

Group Covered		Single Track Miles	Second Track Miles	Third Track Miles	Fourth and Other Track Miles	Yard Tracks and Sidings Miles	Total All Tracks Miles
I. Me., N. H., Vt., Mass., R. I. and Conn.	1915.. 1890..	7,889 7,425	1,584 1,248	140 29	152 19	3,937 2,399	13,702 11,120
II. N. Y., N. J., Penn., Del., Md. and Dist. of Col.	1915.. 1890..	25,020 17,237	8,861 4,948	1,767 664	1,370 507	19,172 7,533	56,190 30,889
III. Ohio, Ind. and So. Pen. of Mich.	1915.. 1890..	23,727 20,903	5,211 1,048	477 12	362 3	14,151 6,179	43,928 28,145
IV. Va., W. Va., N. C. and S. C.	1915.. 1890..	15,708 8,658	1,658 26	16	4	5,860 1,115	23,246 9,799
V. Ga., Fla., Ky., Tenn., Ala. and Miss.	1915.. 1890..	31,438 15,877	1,749 4	26	240	9,239 2,149	42,692 18,030
VI. Ill., Ia., Wis., Minn., and parts Mich., Mo., N. D. and S. D.	1915.. 1890..	56,025 38,198	5,216 1,012	253 54	225 31	19,227 7,594	80,946 46,889
VII. Neb., Mont., Wyo. and parts of Colo., N. D. and S. D.	1915.. 1890..	12,136 8,807	1,532 13	7	2	4,358 1,307	18,035 10,127
VIII. Kan., Ark., Okla. and parts of Mo., Colo., Tex. and N. M.	1915.. 1890..	33,818 21,173	1,708 93	24 2	76 1	10,470 3,111	46,096 24,380
IX. La., Tex. (except Pan- handle) and parts of N. M.	1915.. 1890..	16,683 7,988	134	6		4,568 936	21,391 8,924
X. Wash., Ore., Cal., Ida., Nev., Utah, Ariz., and parts N. M.	1915.. 1890..	24,868 10,135	1,022 45	19	25	7,184 1,387	33,118 11,567
United States	1915.. 1890..	247,312 156,404	28,675 8,438	2,735 761	2,456 562	98,166 33,711	379,344 199,876

The details of this table will repay study by any reader interested in the provision made by the railways of transportation facilities in the various sections of our three million square mile republic. The density of traffic can be roughly judged by the mileage of auxiliary tracks, viz. 8,861 miles of second track, etc., in Group II down to 134 miles in the great Texan group. Note that Group IX is the only division without a single mile of fourth track.



CONDITIONS IN THE UNITED STATES AND EUROPE.

Following our practice, on the preceding page we reproduce the map of the United States divided into the territorial groupings as established by the Interstate Commerce Commission in 1890. In this we have grouped the European states whose areas most nearly approximate the respective groups, and in the accompanying table will be found a statement giving the population and railway mileage of the respective divisions:

SUMMARY SHOWING POPULATION AND RAILWAY MILEAGE OF THE AMERICAN GROUPS IN 1915 AND EUROPEAN COUNTRIES SHOWN ON THE ACCOMPANYING MAP.

Division	United States		Europe	
	Population 1915	Miles of Railway 1915	Population	Miles of Railway
I.....	7,059,361	7,889	22,376,100	14,307
II.....	23,274,618	25,020	46,035,570	23,441
III.....	10,902,211	23,727	35,238,997	10,800
IV.....	7,509,328	15,708	15,768,797	3,827
V.....	13,182,167	31,438	7,995,974	10,770
VI.....	15,083,922	56,025	106,697,937	53,054
VII.....	2,591,924	12,136	65,148,182	42,590
VIII.....	8,701,484	33,818	33,735,416	17,581
IX and X.....	12,094,303	41,551	122,550,700	36,271
Total.....	*100,399,318*	247,312	455,547,673	212,641

*U. S. Census Estimate, July 1, 1915.

In this table the data for the United States is brought down to date; that for the European countries ante-dates the war, and will have to stand until statistics resume their interrupted relation to the life and industry of that distracted continent. It will be perceived that the ratio of population to railway mileage in Europe is as 2,142 to one, whereas in the United States it is only 406 to 1. In other words, the proportion of railway mileage to population is more than 5 to 1 in favor of the American citizen.

RAILWAY MILEAGE IN FOREIGN COUNTRIES.

Among the foreign periodicals that have not suffered total eclipse owing to the war is the *Archiv für Eisenbahnwesen*, upon which we have become accustomed to rely for an authoritative summary of the Railways of the World. It, however, gives evidences of the interruption in the sources of its information, and so the table which follows from its issue of May-June, 1915, in many portions does not differ materially from that of the preceding year. In this the inter-

esting distinction is made between state and private ownership in 1913:

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF MILEAGE TO AREA AND POPULATION IN EACH COUNTRY, TOGETHER WITH STATE-OWNED MILEAGE IN 1913.

Countries	Mileage in 1913		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line
	State Railways	Total Railways		
I. EUROPE				
Germany.....	36,538	39,513	19.0	1,698
Austria-Hungary (including Bosnia and Herzegovina).....	23,391	28,643	10.9	1,792
Great Britain and Ireland.....	.....	23,385	19.3	1,943
France.....	5,597	31,737	15.3	1,241
Russia in Europe (including Finland 2,329 miles).....	24,509	38,562	1.9	3,300
Italy.....	9,070	10,933	9.8	3,162
Belgium.....	2,699	5,465	48.1	1,356
Luxemburg.....	122	326	32.5	757
Netherlands.....	1,111	2,019	15.8	2,880
Switzerland.....	1,698	3,015	18.8	1,177
Spain.....	.....	9,517	5.0	1,967
Portugal.....	712	1,849	5.2	2,932
Denmark.....	1,215	2,338	15.8	1,105
Norway.....	1,631	1,917	1.6	1,222
Sweden.....	2,858	8,984	5.2	609
Servia.....	633	633	3.4	4,480
Roumania.....	2,200	2,333	4.7	2,932
Greece.....	.....	998	4.0	2,644
Bulgaria.....	1,197	1,197	3.2	3,584
Turkey in Europe.....	.....	1,236	1.9	5,040
Malta, Jersey, Isle of Man.....	.....	68	16.1	5,376
Total for Europe, 1913.....	115,181	214,668	5.6	2,042
" " " 1912.....	111,745	212,425	5.6	2,064
" " " 1911.....	109,719	210,574	5.6	2,063
" " " 1910.....	107,727	207,444	5.5	2,180
" " " 1909.....	.....	204,864	5.5	1,923
" " " 1908.....	.....	201,619	5.3	1,941
" " " 1907.....	.....	199,345	5.3	1,887
" " " 1906.....	.....	196,437	5.2	1,993
" " " 1905.....	.....	192,507	5.1	2,064
" " " 1904.....	.....	189,806	5.0	2,084
" " " 1903.....	.....	186,685	5.0	2,084
" " " 1902.....	.....	183,989	4.9	2,127
" " " 1901.....	.....	180,817	4.8	2,174
" " " 1900.....	.....	176,396	4.7	2,220
" " " 1899.....	.....	172,963	4.6	2,220
" " " 1898.....	.....	167,614	4.4	.....
" " " 1897.....	.....	163,550	4.3	.....
" " " 1896.....	.....	160,030	4.2	.....
Increase in eighteen years.....	.....	54,638	.....	.....

Countries	Mileage in 1913		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line
	State Railways	Total Railways		
II. AMERICA				
Canada.....	1,768	29,233	0.8	265
United States of America (inclusive of Alaska 653 miles).....		254,769	7.1	381
Newfoundland.....		768	1.8	309
Mexico.....	12,324	15,805	2.1	922
Central America.....	358	2,001	....	....
Greater Antilles.....	149	3,398	....	....
Lesser Antilles.....		335	....	....
Colombia.....	110	620	0.13	7,331
Venezuela.....	68	632	0.16	3,840
British Guiana.....		104	0.11	2,829
Dutch Guiana.....		37	....	....
Ecuador.....		650	0.64	2,150
Peru.....	1,050	1,715	0.32	2,781
Bolivia.....		1,499	0.32	1,507
Brasil.....	6,712	15,491	0.48	1,613
Paraguay.....		231	0.16	2,734
Uruguay.....		1,636	2.4	637
Chili.....	1,977	3,949	1.3	840
Argentine Republic.....	3,482	20,593	1.9	238
Total for America.....	27,998	353,466	....	....
III. ASIA				
Central Russia in Asia, including Siberia and Manchuria.....	6,788	9,864	....	....
China.....		6,109	0.14	53,760
Japan (including Corea).....	4,859	6,811	2.7	9,487
British India.....	29,252	34,572	1.8	8,960
Ceylon.....		602	2.4	6,720
Persia.....		33	0.005	268,800
Asia Minor, Syria, Arabia, including Cyprus...	910	3,390	0.48	5,760
Portuguese Indies.....		51	3.5	11,520
Malay Archipelago.....		856	2.6	840
Dutch Indies.....	1,533	1,769	0.8	16,128
Siam.....	596	701	0.32	13,440
Cochin China.....		2,292	....	....
Total for Asia.....	43,938	67,050	....	....

Countries	Mileage in 1913		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line
	State Railways	Total Railways		
IV. AFRICA				
Egypt.....	2,903	3,687	1.0	3,043
Algiers and Tunis.....	1,799	3,957	1.1	1,698
Belgian Congo.....		862	...	.....
South African Union, including Cape Colony, Natal, Cent. So. Africa and Rhodesian Rail- ways.....	7,829	10,929	.....	.....
COLONIES				
German.....	2,589	2,589	....	.....
English.....	1,811	2,350	....	.....
French.....		1,995	....	.....
Italian.....		96	....	.....
Portuguese.....		1,007	....	.....
Total for Africa.....	16,431	27,472	....	.....
V. AUSTRALIA				
New Zealand.....	2,354	2,883	2.7	354
Victoria.....	3,639	3,664	4.2	347
New South Wales.....	3,922	4,088	1.3	391
South Australia.....	2,076	2,308	0.16	181
Queensland.....	4,514	4,807	0.64	188
Tasmania.....	506	699	2.7	266
West Australia.....	2,848	3,422	0.32	138
Hawaii, etc.....		88	1.3	1,241
Total for Australia.....	20,359	21,959	0.64	273
RECAPITULATION				
I. Europe.....	115,181	214,668	5.6	2,042
II. America.....	27,998	353,466	....	.....
III. Asia.....	43,938	67,050	....	.....
IV. Africa.....	16,431	27,472	....	.....
V. Australia.....	20,359	21,959	0.64	273
Total.....	223,907	684,615	....	.....

After correcting an error of about 1,000 miles heretofore reported by the *Archiv* for Asia, there is a gain for the world of 15,009 miles. State railways grew 9,566, mostly by absorption; and private, 5,443 by actual construction. For were it not that 4,478 miles in Mexico, 1,000 in Argentina and over 1,000 in Australia were transferred from the private to the state column, the gains would have been some 3,000 for state and 12,000 for private railways.

Private operation continues the world policy. Less than one-third the world's total is state mileage, the United States alone having 30,208 more miles than all the government railways of the world. Of 75 nations and colonies, 42 have a majority of private mileage against 33 of state; whereas 26 rely wholly on private roads, only 7 rely wholly on state; even in Europe government ownership predominates in only 10 out of 21 countries.

II EQUIPMENT

Since the close of the fiscal year 1915, there has come about a situation in regard to railway equipment that has been foreseen and predicted by every student of railway affairs gifted with the most elementary faculty of drawing conclusions from facts. It was inevitable that there would come a time when the equipment adequate to handle traffic during a period of industrial depression would be found inadequate to handle anything approaching a resumption of business on the progressive scale that preceded the panic of November, 1907. During the preceding decade railway traffic measured by earnings had increased over 130%, the passengers carried one mile had increased 131.7%, and the freight tons carried one mile 154.3%. This last amazing increase had been handled with an increase of 100% in the weight of locomotives and 127% in the capacity of freight cars, signifying remarkable economies in the use of power and facilities. But even at that it took an increase of car capacity of over 8% a year compounding to handle the increased traffic, and in October, 1907, there was a net shortage of 86,811.

In eight years between 1907 and 1915 the traffic of American railways increased less than 14%, or, taking the peak between those years, less than 21%, or about 2.5% a year. This was attended by an increase of 45% in locomotive weight and of 42% in car capacity, so at no time during the period of eight years since 1907 were the facilities of the railways more than locally or temporarily taxed.

Last June, just before the war boom set in, the net surplus of cars reported was 299,928. Had traffic increased since 1907 at the same rate as during the preceding decade, it would have required theoretically nearly 30% more locomotive power and car capacity than the railways possessed to handle it.

And now they have to provide power and equipment to meet an unprecedented rush, when factories are crowded with other orders and prices are soaring and deliveries are delayed. They had not the money to buy when factories were idle and prices were alluring. And that is why the railways realize the force of the old saw, "It is always a feast or a famine."

The first summary under this title gives the number of cars and locomotives built in the United States since 1899, by years, from information compiled by the *Railway Age-Gazette*.

**SUMMARY SHOWING THE NUMBER OF CARS AND LOCOMOTIVES BUILT
DURING THE YEARS 1899 TO 1915.**

Year	Locomo- tives	Number Passenger Cars	Freight Cars
1915†.....	2,085	1,949	74,112
1914†.....	2,235	3,691	104,541
1913†.....	5,332	3,296	207,684
1912†.....	4,915	3,060	152,429
1911*.....	3,530	4,246	72,161
1910*.....	4,755	4,412	180,945
1909*.....	2,887	2,849	93,570
1908*.....	2,342	1,716	76,555
1907*.....	7,362	5,457	284,183
1906*.....	6,952	3,167	240,503
1905*.....	5,491	2,551	165,155
1904.....	3,441	2,144	60,806
1903.....	5,152	2,007	153,195
1902.....	4,070	1,948	162,599
1901.....	3,384	2,055	136,960
1900.....	3,153	1,636	115,631
1899.....	2,475	1,305	119,886
Total.....	69,561	47,489	2,400,910

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

If the student will bear in mind that the number of freight cars in the United States now is approximately 2,400,000 and that 5% is a moderate allowance for their wear, waste and destruction, he will understand how far below the needs of the situation as it now confronts the roads is an average construction of 120,000 freight cars a year, including cars built for Canadian roads. It is a significant coincidence that 5% of the total freight cars in the United States is 120,000 and it would be alarming if the capacity of the new cars was not fully 20% greater than that of those they replace.

It may be noted that the number of freight cars built since 1899 is practically identical with the total number in service. What has become of the 1,295,510 reported on the rails in 1899?

NUMBER AND CAPACITY OF LOCOMOTIVES.

The next summary gives the number, tractive power and weight of steam locomotives in the United States since the Commission has included their capacity in its reports :

SUMMARY SHOWING NUMBER, POWER AND WEIGHT OF LOCOMOTIVES
IN THE UNITED STATES DURING THE YEARS 1915 TO 1902.

Year	Number	Tractive Power (Pounds)	Weight without Tender (Tons)	Average Weight (Tons)
1915 Reported to Bureau.....	64,950	2,004,321,000	5,470,000	84.2
1914 " " " ".....	64,430	1,997,604,184	5,413,250	84
1914 Official.....	⑥63,510	1,931,953,982	5,271,123	83
1913 ".....	⑥62,211	1,847,798,393	5,004,720	80
1912 ".....	*61,010	1,746,964,128	4,719,251	77
1911 ".....	*60,162	1,681,495,905	4,537,653	75
1910 ".....	*58,240	1,588,894,480	4,274,208	73.5
1909 ".....	*56,468	1,503,971,444	4,056,733	72.0
1908 ".....	†56,867	1,498,793,551	4,012,553	71.0
1907 ".....	55,388	1,429,626,658	3,828,045	69.1
1906 ".....	51,672	1,277,865,673	3,459,052	66.9
1905 ".....	48,357	1,141,330,082	3,079,673	63.6
1904 ".....	46,743	1,063,651,261	2,889,492	62.1
1903 ".....	43,871	953,799,540	2,606,587	59.4
1902 ".....	41,225	839,073,779	2,323,877	56.3
Increase in thirteen years to 1915...	57.5%	138.9%	135.4%	49.5%

⑥Class I and II roads only. Locomotives of omitted Class III roads were: In 1912, 986; in 1913 unreported; in 1914, 898.

*Excludes locomotives of switching and terminal companies; also excludes unclassified and Mallet locomotives, numbering as follows:

	1909	1910	1911	1912	1913	1914
Unclassified.....	744	707	730	718	450	475
Mallet.....	...	...	435	534	717	775

†Excludes 831 unclassified locomotives but includes 838 locomotives of switching and terminal companies. Previous years include both switching and terminal companies and unclassified.

For some reason the Commission's new blanks for 1915 did not call for the weight of locomotives without tender but retained the item "Weight on drivers." For the roads reporting to this Bureau this item amounted to 4,485,427 tons against 4,268,336 tons reported to the Commission in 1914 for Class I and II roads.

In addition to steam locomotives, the roads reported 301 electric locomotives, but with very incomplete details as to weight on drivers and tractive capacity.

The 64,950 locomotives reported in 1915 were divided as follows:

	Number	Weight on Drivers Tons	Tractive Power 000 Pounds
Road locomotives of 69 inch or less drivers.....	49,340	3,472,386	1,797,051
Road locomotives of more than 69 inch drivers.....	6,922	454,731	270,353
Switching locomotives.....	8,688	558,310	936,917
Total.....	64,950	4,485,427	2,004,321

EQUIPMENT PREVIOUS TO 1902.

The earlier reports of the Commission, that is prior to 1902, were confined to the number of locomotives and cars, irrespective of capacity. Even so the following figures for thirteen years retain their value for comparative purposes:

	Locomotives	Passenger Cars	Freight Cars	Company Cars
1901.....	39,534	35,969	1,464,328	50,536
1900.....	37,663	34,713	1,365,531	50,594
1899.....	36,703	33,850	1,295,510	46,556
1898.....	36,234	33,595	1,248,826	43,753
1897.....	35,986	33,626	1,221,730	42,124
1896.....	35,950	33,003	1,221,887	42,759
1895.....	35,699	33,112	1,196,119	41,330
1894.....	35,492	33,018	1,205,169	39,891
1893.....	34,788	32,911	1,201,273	39,762
1892.....	33,136	28,876	966,998	36,901
1891.....	32,139	27,949	947,300	35,185
1890.....	30,140	26,820	918,491	32,895
1889.....	29,036	24,586	829,885	31,020

In connection with preceding statements this table shows that since 1889 there has been an increase of over 127% in the number of locomotives. As this has been attended with an increase in their average weight from 40 tons to 85.4 tons, the total capacity of locomotives must have increased approximately 384%. In tractive power the increase has been even greater.

STEEL PASSENGER CARS IN SERVICE.

This Bureau is indebted to the courtesy of the Committee on Relation of Railway Operation to Legislation of the American Railway Association for the accompanying statement showing the progress made in equipping American railways with steel passenger cars, brought down to January 1, 1916:

	Steel	Steel Under-frame	Wooden
January 1, 1916	14,486	5,860	41,382
January 1, 1915	12,900	5,700	43,512
January 1, 1914	9,492	4,608	44,560
January 1, 1913	7,271	3,296	46,926
January 1, 1912	5,347	2,399	48,126
January 1, 1911	3,133	1,636	50,201
January 1, 1910	1,117	1,098	.....
January 1, 1909	629	673	.....
Increase 1915 over 1909 .....	.....	.....	.....

These figures include the steel passenger equipment of Canadian roads, which accounts for totals larger than those shown in the Bureau's returns for 1915.

COST OF RAILWAY EQUIPMENT.

The one item about which the public is persistently inquisitive and official statistics as persistently reticent is the cost of equipment. For obvious reasons it is impractical to give the average cost of locomotives, passenger and freight cars with anything like scientific accuracy, and railway trade papers, while giving all the dimensions and specifications of railway equipment down to the last detail, avoid the one figure that the lay reader might understand—the cost. From data furnished in the preceding pages it is found that American railway equipment is mostly modern—that is to say, it has been built in the 20th century. The figures are as follows:

	Numbers in 1915	Built from 1900 to 1915
Locomotives	64,950	69,561
Passenger cars	54,378	47,489
Freight cars	2,362,914	2,400,910

These figures indicate that four-fifths of our present equipment of locomotives and freight cars and three-quarters of our pas-

senger cars have been purchased since 1900, and that the prices of 1908 may be accepted as an average cost. This would warrant the cost prices used in the following estimate of the cost of the present equipment of the railways of the United States:

COST OF RAILWAY EQUIPMENT.
(247,312 miles represented)

64,950 Locomotives, @ \$17,000.....	\$1,104,150,000
15,175 Steel and steel underframe passenger cars @ \$12,000....	182,100,000
39,203 Wooden passenger cars @ \$6,500.....	254,819,500
2,362,914 Freight cars @ \$900.....	2,126,622,600
124,821 Company's cars @ \$500.....	62,410,500
<hr/>	
Total cost of equipment.....	\$3,730,102,600

The only item in this table which the uninitiated may be inclined to question is the cost of locomotives, whereas to the writer it appears well within the mark. The reader will find corroboration for this view in the fact that in 1909 the government of New South Wales, at its own railway shops in Sydney, built 10 engines averaging, with tender, 163,128 pounds. In the return to the legislature they were figured out to have cost \$24,063.53 per engine, or \$330.23 per ton of 2,240 pounds, or \$294 per American ton. The weight on drivers of American locomotives in 1915 was 4,485,427 tons. At \$294 per ton this would make an aggregate cost of \$1,319,705,538, or \$215,555,538 more than the above estimate at \$17,000 per locomotive. Moreover, "weight on drivers" falls nearly 20% short of the weight of the engine exclusive of tender, to say nothing of the weight of the tenders themselves, all included in the New South Wales example.

Other items of cost in the above estimate of cost of equipment may be compared with the figures in the following statement, furnished by a railway official, showing the difference in the cost of the units in a passenger train in 1903 and 1913.

Actual Cost	1903	1913
Locomotive.....	\$16,638	\$23,135
Chair car.....	9,393	11,580
Parlor car.....	14,343	17,019
Dining car.....	14,550	20,227
Coach.....	9,195	12,369
Baggage car.....	5,048	11,185
Mail car.....	7,729	16,901
Cafe car.....	11,000	18,381
Total.....	\$87,895	\$130,797

This is not a typical train, but the locomotive, coach, baggage and postal cars are universal units of American railway trains.

Electric locomotives have recently been added to the service of the steam railways, with a total weight of 564,000 pounds, of which 448,000 was "on drivers."

EQUIPMENT BY I. C. C. GROUPS.

The next summary distributes railway equipment by the territorial groups abandoned by the Commission's department of statistics since 1910, with which comparison is made:

SUMMARY SHOWING ASSIGNMENT OF EQUIPMENT BY TERRITORIAL GROUPS FOR THE YEARS ENDING JUNE 30, 1915 AND 1910.

Territory Covered	Locomotives		Cars Passenger Service		Cars Freight Service	
	1910	1915	1910	1915	1910	1915
	Official	Bureau	Official	Bureau	Official	Bureau
Group I.....	3,297	3,046	5,356	5,137	83,091	80,223
Group II.....	13,697	14,967	12,281	14,949	516,299	585,032
Group III.....	8,994	10,170	5,593	6,362	402,915	427,884
Group IV.....	3,102	4,220	2,097	2,527	123,831	166,967
Group V.....	4,700	6,327	3,403	4,772	170,786	230,176
Group VI.....	10,707	11,532	7,611	8,066	428,363	417,463
Group VII.....	2,480	2,498	1,688	2,078	74,166	77,142
Group VIII.....	5,971	6,103	3,874	4,567	189,138	200,037
Group IX.....	2,427	2,335	1,506	1,554	60,015	57,061
Group X.....	3,662	4,053	3,666	4,376	86,527	120,339
United States.....	*58,947	†65,251	*47,096	54,378	*2,135,121	2,362,914

*Exclusive of equipment of switching and terminal companies, included in Bureau's figures, 1910 total of locomotives includes Mallets.

†Includes 301 electric locomotives.

Although the figures for the respective groups are not strictly comparable, because of changes in the arbitrary assignment of some roads operating in several groups, they yet afford a fairly accurate view of the distribution of railway equipment throughout the Union.

NUMBERS OF DIFFERENT CLASSES OF FREIGHT CARS.

The next statement gives the number of the several classes into which cars are divided, as reported to the Commission since 1902:

Year	Box Cars	Flat Cars	Stock Cars	Coal Cars	Tank Cars	Refrigerator Cars	Other Cars
1914 [⊙]	1,043,796	146,133	82,971	899,314	8,530	48,886	96,017
Average capacity in Tons.....	35	36	31	45	40	32	42
1913 [⊙]	1,032,585	147,541	78,308	871,339	8,216	43,389	91,911
1912 [*]	1,004,005	150,840	76,535	855,111	7,836	30,693	90,219
1911 [*]	990,313	153,300	77,590	853,699	7,787	31,786	80,856
1910 [*]	966,577	153,918	77,584	818,689	7,434	30,918	78,411
1909 [*]	941,533	154,630	73,494	792,291	6,630	28,204	74,556
1908.....	950,209	159,749	76,219	805,185	6,888	27,930	70,054
1907.....	904,821	156,860	69,997	746,670	5,972	33,617	68,080
1906.....	843,118	146,908	64,202	686,717	5,324	31,782	55,584
1905.....	802,964	146,050	62,988	632,171	4,918	26,844	51,685
1904.....	780,445	147,226	64,270	622,568	4,520	22,735	46,577
1903.....	765,820	154,074	61,790	595,963	4,421	21,454	47,093
1902†.....	708,861	142,303	57,668	534,448	3,533	18,222	40,957
Average capacity in Tons.....	27	26	25	31	30	26	27

[⊙]Class I and II roads only.

^{*}Excludes switching and terminal companies.

†Exclusive of 40,109 cars for which complete returns were not secured, a condition which did not recur subsequently, though in each year a number are excluded for incomplete returns.

For 1915 the returns to this Bureau show 1,060,690 box cars; 141,595 flat cars; 929,433 coal cars and 56,197 refrigerator cars.

Some idea of the rush for equipment started in response to the boom in traffic in the fall of 1915 may be had from a comparison of the car orders for the six months ending February 29, 1916, as follows:

	1915-16	1914-15
September.....	5,125	500
October.....	24,680	2,775
November.....	32,300	1,050
December.....	15,023	1,325
January.....	30,300	3,300
February.....	12,650	4,255
Total 6 mos.....	120,078	13,205

The contrast is no less impressive when it is considered that the small orders of 1914-15 were at purchaser's prices, with prompt delivery, while the heavy orders of 1915-16 are at manufacturer's prices, with delayed deliveries.

THE WORLD'S MIGHTIEST ELECTRIC FREIGHT LOCOMOTIVE



Length, 112 feet 8 inches. Weight, 284 tons. Used to haul trains over the Rockies from Harlowton, Mont., to Avery, Idaho. Electricity generated by water power.

EQUIPMENT OF FOREIGN RAILWAYS.

It may be of interest to compare the foregoing facts relating to the equipment of American railways with the corresponding data for foreign railways, so far as it can be ascertained, as follows:

SUMMARY SHOWING THE NUMBER OF LOCOMOTIVES, PASSENGER CARS AND FREIGHT CARS OF THE PRINCIPAL COUNTRIES OF THE WORLD.

	Locomotives	CARS	
		Passenger Service	Freight Service
United Kingdom, 1913	24,718	79,314	780,746
Germany, 1913.....	29,520	86,873	692,053
France, 1911	13,434	51,144	340,048
Russia, 1910	19,984	26,043	450,273
Austria, 1912	7,494	20,028	144,198
Hungary, 1912	4,219	9,142	99,285
Italy, 1913	5,110	14,005	95,428
Spain, 1912	2,383	6,075	46,675
Belgium, 1912.....	4,288	10,582	85,615
Netherlands, 1914	1,314	3,967	26,197
Denmark, 1914.....	624	2,050	9,664
Sweden, 1912	1,951	3,820	49,272
Norway, 1914.....	463	970	9,923
Switzerland, 1913	1,634	5,737	17,762
Roumania, 1914.....	888	1,793	22,258
Bulgaria, 1912.....	212	514	4,605
Serbia, 1911.....	87	247	3,118
Canada, 1914.....	5,447	6,082	204,190
British India, 1914	8,019	22,881	171,741
Australia, 1915	3,454	6,004	70,717
New Zealand, 1914	534	1,363	20,251
British South Africa, 1914.....	1,522	2,610	26,196
Argentina.....	2,781	2,294	50,612
Japan, 1914	2,500	6,453	42,705
Total Twenty-four Countries	142,580	360,911	3,443,532
United States	64,950	54,378	2,362,914

GERMAN RAILWAY EQUIPMENT.

In Germany the average weight of the locomotive, including the tender, is under 52 tons, which has to be compared with 84 tons in the United States, exclusive of tender.

In 1913, the passenger equipment of German railways consisted of 65,961 cars, of which 9,431, or 14.3%, had four or more axles; 24,143 had two axles and 32,387 had three axles. Of the passenger cars only 55,881, or 84.7%, had air brakes. Distributed by classes, the German passenger equipment for the last four years reported was as follows:

**DISTRIBUTION OF GERMAN PASSENGER CAR EQUIPMENT TO CLASS
OF TRAVEL IN 1910 TO 1913.**

	1910	1911	1912	1913
Class I.....	135	134	139	147
Class I and II.....	6,323	6,220	6,085	5,913
Class I, II, and III.....	1,369	1,370	1,378	1,400
Class II.....	3,005	3,210	3,447	3,705
Class II and III.....	5,736	6,044	6,331	6,562
Class II, III and IV.....	38	37	39	74
Class III.....	24,961	25,992	27,485	29,326
Class III and IV.....	483	510	509	567
Class IV.....	14,931	15,655	16,528	17,563
Special.....	663	685	708	704
Total Passenger Cars.....	57,644	59,857	62,649	65,961
Baggage cars.....	15,840	16,238	16,880	18,108
Mail cars.....	2,654	2,689	2,717	2,804
Total Passenger Service Cars.....	76,138	78,784	82,246	86,873

The German freight cars, which are the largest in Europe, have an average capacity of under 15 tons; in 1913, 13,971, or 2.1%, of them had more than two axles against 2.3% in 1911; and only 34.1% of all freight and baggage cars together have brakes of any description against 34.6% in 1911. The freight cars of Germany are not being modernized to any appreciable extent. Distributed between covered and uncovered "wagons," with the capacity of each class, the German equipment since 1901 is shown in the next summary:

NUMBER AND AVERAGE CAPACITY OF GERMAN FREIGHT CAR EQUIPMENT, 1901 TO 1913.

Year	Covered Wagons		Uncovered Wagons		Total Freight Wagons	
	Number	Capacity Average Tons	Number	Capacity Average Tons	Number	Capacity Average Tons
1913.....	207,762	14.53	459,286	14.78	*667,048	14.55
1912.....	195,071	13.89	432,332	14.58	627,403	14.38
1911.....	183,602	13.78	413,161	14.26	596,763	14.11
1910.....	171,937	13.56	394,003	13.74	565,940	13.68
1909.....	163,829	13.44	378,424	13.56	542,253	13.52
1908.....	159,102	13.38	362,644	13.36	521,746	13.36
1907.....	152,753	13.26	345,170	13.16	497,923	13.20
1906.....	141,946	13.08	325,118	12.98	467,064	13.02
1905.....	134,763	12.92	307,611	12.82	442,374	12.86
1904.....	125,498	12.62	300,580	12.72	426,078	12.68
1903.....	122,027	12.42	295,388	12.62	417,415	12.56
1902.....	122,516	12.34	291,210	12.52	413,726	12.44
1901.....	122,059	12.14	288,114	12.42	410,108	12.34

*In addition there were service cars and owner's cars in 1913 totalling 25,005.

SURPLUSES OR SHORTAGES OF AMERICAN FREIGHT CARS.

No single summary reflects the ebb and flow of American freight traffic with greater certainty than the following table compiled from the reports of the Committee on Car Efficiency of the American Railway Association since 1907. Its reports, issued monthly, are the earliest barometer of traffic conditions.

FREIGHT CAR SHORTAGE AND SURPLUS, BY MONTHS, FROM
JANUARY, 1907, TO MARCH, 1916.

Year	January	February	March	April	May	June
1907 Net Shortage.....	85,000	140,000	.....	81,000	40,000	4,000
1908 Net Surplus.....	341,842	321,264	296,035	413,338	404,375	349,567
1909 " ".....	332,513	300,971	290,868	296,320	284,292	262,117
1910 " ".....	26,844	14,309	17,342	77,357	122,593	126,497
1911 " ".....	119,820	173,667	207,261	186,053	187,278	163,170
1912 " ".....	90,285	13,958	3,043	79,389	116,201	67,718
1913 " ".....	28,439	22,183	37,775	57,498	50,294	63,927
1914 " ".....	214,889	197,052	124,865	212,969	238,642	241,802
1915 " ".....	(no report)	279,411	321,952	327,084	291,303	299,928
1916 " ".....	47,081	20,299	19,537	3,650	.....	.....

Year	July	August	September	October	November	December
1907 Net Surplus or Shortage.....	44,000	20,000	42,000	86,811	44,802	208,586
1908 Net Surplus.....	308,171	252,149	170,652	100,073	109,515	221,058
1909 " ".....	243,015	157,415	71,373	5,740	12,032	34,300
1910 " ".....	142,865	73,679	47,076	7,235	13,581	51,413
1911 " ".....	149,072	104,170	64,283	20,532	26,514	76,814
1912 " ".....	68,922	43,901	8,620	31,579	51,250	34,392
1913 " ".....	69,405	54,425	40,159	6,048	22,652	101,545
1914 " ".....	226,541	172,145	136,049	151,982	170,096	(no report)
1915 " ".....	275,636	265,364	185,009	78,331	28,268	37,402
1916 " ".....	.....	.....	.....	.....	.....	.....

*Net Shortage shown in heavy face type. Figures are for mid-month except when turning point occurred elsewhere. Those since February, 1915, are for the first of the month.

The abnormal character of the present railway activity is emphasized by the contrast of a net shortage of 19,537 cars on March 1, 1916, with a net surplus of 321,952 on March 1, 1915.

FREIGHT CAR PERFORMANCE.

Although the Committee on Relations between Railroads discontinued its reports of the data contained in the next summary in July, 1914, its publication is continued as of permanent value for

reference on the subject to which it relates. Today it would be interesting to know how a record traffic would affect this "barometer."

SUMMARY SHOWING THE AVERAGE PERFORMANCE OF AMERICAN AND CANADIAN FREIGHT CARS DURING THE YEARS ENDING JUNE 30, 1914, 1913, 1912 AND 1909, AND AVERAGE CAR LOAD IN 1914 AND 1913.

Month Year Ending June 30.	Average Miles per Day per Car				Average Ton Miles Per Car per Day				Average Tons per Loaded Car	
	1913-14	1912-13	1911-12	1908-09	1912-13	1912-13	1911-12	1908-09	1913-14	1912-13
July	23.7	23.2	21.9	20.0	375	362	317	275	23.2	22.5
August	25.2	24.3	22.9	20.8	382	385	350	292	22.5	22.3
September	24.3	24.4	23.8	22.0	401	396	368	320	23.3	22.3
October	25.7	26.0	25.0	23.8	423	433	382	346	23.2	22.9
November	25.7	26.0	24.4	23.5	405	424	376	341	22.8	22.8
December	23.5	24.4	23.4	22.3	369	396	361	332	23.9	23.1
January	22.9	24.3	20.4	20.9	338	392	325	293	22.9	23.6
February	21.8	24.7	22.9	21.7	333	395	370	306	22.6	22.9
March	23.8	23.7	24.5	22.7	369	374	389	330	21.0	22.7
April	23.0	24.0	23.3	22.4	334	369	340	310	24.1	22.2
May	22.2	25.0	23.7	22.5	320	387	350	304	21.2	22.6
June	22.7	24.3	24.1	22.4	345	377	366	314	22.5	22.5
July, 1914	22.5	.....	.....	.....	352	.....	.....	.....	23.0	.....

SAFETY APPLIANCES.

Although official statistics continue to devote considerable space to rolling stock equipped with automatic couplers and train brakes, the adoption of these characteristic American safety appliances has become so well-nigh universal (99.7% and 98%, respectively) as to deprive them of contemporaneous interest.

BLOCK SIGNALS.

Steady progress is reported in placing American railways under the protection of the Block Signal System wherever traffic conditions call for it. The figures given below, compiled from the *Railway Age-Gazette* returns, indicate that nearly 40% of the railway mileage of the United States is now operated under the protection of manual or automatic signals.

Item	January 1, 1916			1906
	Single Track (Miles)	Two or More Tracks (Miles)	Total	Total
Automatic Block Signals.....	14,377	16,783	31,160	9,743
Increase over preceding year.....			1,471	
Non-Automatic Block Signals.....	59,453	7,196	66,649	43,390
Increase over preceding year.....			8,206	
Both classes	73,830	23,979	97,809	53,133
Increase over preceding year.....			9,677	
Increase in nine years.....			44,676	

On January 1, 1916, Canada had 8,787 miles operated under the block system, of which 611 miles was automatic.

The above table shows that the installation of the Block Signal System is more than keeping pace with the increase in operated mileage, which for the past nine years was about 34,000 against 44,676 miles covered by block installation during the same period. As the cost of such installation has been placed at \$1,232 per mile by a Committee of the American Railway Association, it appears that American railways have approximately \$120,000,000 invested in this "Safety First" economy.

No progress has been recorded during the year in the search for a practicable automatic stop. Successful passing of working tests seems impossible to the most promising devices.

THE LARGEST ELECTRIC PASSENGER LOCOMOTIVE IN THE WORLD.



Rated at 4,000 horse power and weighs 156 tons. Used between Manhattan Transfer and New York City. Will haul heavy Pullman train 60 miles an hour.

III

EMPLOYES AND THEIR COMPENSATION*Number 1,567,700.**Pay \$1,285,116,800.*

Official innovations have introduced so many material changes in classification in returns on "Employes and Their Compensation" as to confuse the reports for 1915 and destroy the continuity of statistics of this most vital feature of railway regulation, operation and financing. Where for twenty-three years the United States has had the most complete record in the world covering the numbers, days of service and compensation of eighteen classes of railway employes, the new scheme calls for the number of *sixty-eight* classes of employes in service on the middle of August, October, December, February, April and June, and the average number employed, the total number of hours on duty during the year for each class and the total compensation paid them during the year. The reader can have some idea of the labor some five hundred separate roads are put to in answering these requirements by multiplying the number of items by sixty-eight and then multiplying the product by at least four to represent the number of figures under each item. In some reports a single item calls for nine figures.

The amount of utterly unprofitable bookkeeping required in every railway office in the country to comply with the requirements under this head is absolutely incalculable and the worst of it is that at least half of all the labor serves no tangible purpose. It is of no economic value to know in April, 1916, how many men were on the railway pay rolls on the middle of April, 1915, unless you know how many days they had been there and what compensation they had received for the half month. So long as the Commission calls for the average number of persons employed during the year and the total number of hours they have worked and the aggregate of their pay it has asked for all the useful facts that it can compile and summarize. The rest is a wasteful and vexatious surplusage. With two of these innovations the writer and, he believes, all railway accounting officers are in sympathy, viz., the substitution of the average number of employes in the service and the total number of hours on duty during the year, instead of the number employed on June 30th and the total days worked—both of which were too elastic units for statistical purposes. Unfortunately, even the railway hour is a movable feast, for one or two hours' work may, and very often does,

stand for ten hours' pay on the books. But the substitution of "hours" for "days" as the unit of time is a move in the right direction. The substitution of the average number of employes in service during the year affords an exact divisor to ascertain the average pay per year.

The statistics of employment is further cumbered by calling for special reports as to enginemen and trainmen paid on a mileage basis. The only value of this is to expose what a small proportion of trainmen are paid on this basis, whose pay cannot or has not been reduced to the per hour basis. Having served this purpose and also given a line on the relation of pay on the mileage basis to that on the hour basis, it might be relegated to the limbo for exploded theories.

As for the sixty-eight varieties into which railway employes are divided, except for the arbitrary splitting of classes no such multiplicity in classification exists. Of the whole sixty-eight, save for this splitting of classes, not more than one-half are distinctively railway occupations. There are some of the Class I roads which had no employes in twenty or more classes; some of the Class II roads reported for less than twenty classes, and there were many blanks even in the reports of the largest systems. Moreover, many roads made no attempt at all to comply with the Commission's arbitrary and artificial requirements.

Under these conditions the task of presenting anything like a complete or satisfactory review of the railway employment situation is not a wholly enviable one. But from the data furnished by the roads reporting to this Bureau approximate aggregates have been secured. Generally speaking these reflect the effect of the railway depression in 1915 in the smallest pay roll in numbers and amount since 1911. You have to go back to 1908 to find a record of fewer persons in railway employ than in 1915. The fact that the pay of railway employes was \$265,000,000 more in 1915 than it was for a larger body of employes in 1909 is conclusive proof that railway pay has advanced disproportionately to railway employment.

With these remarks the following summary of employes and their compensation in 1915, condensed from the reports under the new classification, is submitted.

**SUMMARY OF RAILWAY EMPLOYEES, THEIR COMPENSATION AND
RATES OF PAY PER HOUR AND PER YEAR FOR THE YEAR ENDED
JUNE 30, 1915:**

No.		Number Em- ployed at Middle of June	Average Number of Em- ployes	Per 100 Miles of Line	Compen- sation	Average Pay per Hour	Average Pay per Year
1	General Officers, \$3,000 per annum and upwards	3,600	3,326	1.6	\$ 23,337,078	\$2.51	\$6,099
2	General Officers, below \$3,000 per annum.....	3,238	3,324	1.4	5,233,482	.66	1,574
3	Division Officers, \$3,000 per annum and upwards.....	1,023	1,053	.4	3,861,275	1.14	3,667
4	Division Officers below \$3,000 per annum.....	7,489	7,815	3.2	13,210,217	.53	1,690
5	Clerks, \$900 per annum and upwards (except No. 37)...	54,127	55,816	22.6	62,389,656	.42	1,118
6	Clerks below \$900 per annum (except No. 37).....	88,500	93,111	37.6	58,377,109	.22	627
9	M. W. & S. Foremen (exclud- ing Nos. 10 and 28).....	6,241	6,452	2.6	6,903,408	.33	1,070
10	Section Foremen.....	36,999	38,722	15.7	28,303,971	.23	731
11	General Foremen, M. E. De- partment.....	1,502	1,506	.6	2,290,370	.42	1,521
12	Gang and Other Foremen, M. E. Department.....	13,832	14,607	5.9	16,352,224	.35	1,119
13	Machinists.....	31,818	33,753	13.7	33,522,790	.38	993
14	Boilermakers.....	10,364	11,008	4.4	11,506,944	.39	1,045
15	Blacksmiths.....	6,828	7,102	2.9	6,356,888	.37	894
16	Masons and Bricklayers.....	963	1,132	.5	882,810	.28	779
17	Structural Iron Workers....	676	806	.3	711,675	.32	884
18	Carpenters.....	42,622	44,578	18.0	33,086,090	.28	742
19	Painters and Upholsterers...	9,499	8,995	3.6	6,578,685	.30	731
26	Section Men.....	230,657	223,756	90.5	96,104,091	.15	429
27	Other Unskilled Labor.....	87,312	92,213	37.3	50,301,898	.18	545
28	Foremen of Construction Gangs and Work Trains...	2,387	2,617	1.1	2,577,890	.28	965
29	Other Men in Construction Gangs and Work Trains...	43,493	43,898	17.7	21,044,780	.17	479
33	Train Despatchers and Di- rectors.....	4,462	4,768	1.9	7,292,171	.52	1,529
34	Telegraphers, Telephoners and Block Operators.....	17,595	18,628	7.5	14,533,001	.26	780
35	Telegraphers and Telephon- ers Operating Interlockers	7,235	7,520	3.0	6,042,433	.29	804
36	Levermen (non-telegraphers)	3,028	3,201	1.3	2,188,911	.21	684
39	Station Agents (non-teleg- raphers).....	13,807	14,284	5.8	13,180,240	.27	923
40	Station Masters and Assist- ants.....	662	648	0.8	857,693	.28	1,323
42	Yard Masters.....	3,091	3,233	1.3	4,938,819	.41	1,528
43	Yard Masters' Assistants (not yard clerks).....	1,811	1,945	0.8	2,694,975	.37	1,390

No.		Number Employed at Middle of June	Average Number of Em- ployes	Per 100 Miles of Line	Compens- ation	Average Pay per Hour	Average Pay per Year
	Engineers and Motormen—						
44	Yard.....	11,960	12,797	5.2	18,733,201	.42	1,464
52	Road Freight.....	21,879	24,226	9.8	43,414,151	.59	1,792
56	Road Passenger.....	11,715	12,075	4.9	24,651,483	.81	2,041
	Firemen and Helpers—						
45	Yard.....	12,112	13,013	5.3	11,429,623	.26	878
53	Road Freight.....	22,744	25,210	10.2	27,415,537	.37	1,087
57	Road Passenger.....	11,337	11,749	4.7	14,445,069	.50	1,229
	Conductors—						
46	Yard.....	11,415	12,359	5.0	16,099,759	.39	1,303
54	Road Freight.....	18,307	20,089	8.1	30,891,364	.49	1,537
58	Road Passenger.....	9,760	10,178	4.1	17,970,401	.65	1,766
	Brakemen—						
47	Yard.....	29,419	31,754	12.8	35,778,431	.35	1,127
	Brakemen and Flagmen—						
55	Road Freight.....	45,906	50,828	20.6	50,516,713	.33	994
60	Road Passenger.....	13,542	14,029	5.7	13,727,542	.38	978
	Baggagemen—						
59	Road Passenger.....	5,376	5,673	2.3	5,568,162	.36	981
61	Other Road Trainmen.....	3,515	3,841	1.5	3,166,780	.29	825
48	Yard Switch Tenders.....	4,703	4,853	1.9	3,411,148	.19	703
	Total, 44 Classes.....	968,639	1,002,991	405.6	\$851,881,018	\$.29	\$849
	Twenty-two Other Classes, including All Other Em- ployes.....	537,794	539,218	218.0	420,511,833	.22	779
	Total, All Classes.....	1,506,433	1,542,209	623.6	\$1,272,392,851	\$.27	\$825

Mark that the pay of twenty-two classes of railway employees averages over \$1,000 a year, and the average for all is \$825!

In this table, in which all comparative statistics as to the number and compensation of railway employees by classes are put out of joint, the last line is the only one that even affords a satisfactory basis for starting a new series. The reports of all the carriers on the average number employed during the year were fairly complete, although some lapsed to the "on June 30th" practice of former years. Scores of roads returned the information as to classification as "not available." Not a few failed to give the hours on duty, and some accounted for work of classes by days instead of hours. In such cases ten was taken for an average multiplier, as the returns as a whole seemed to warrant.

As will be seen in the table, the writer took the liberty of rearranging the trainmen in three groups as they belonged in Yard, Road Freight, or Road Passenger Service, and he would recommend that the Commission adopt this grouping and consolidate at least two-thirds of its other classifications.

The table shows that between June 30, 1914, and the middle of June, 1915, there was a reduction of 192,385 in the number of employes, the number at the middle of June, 1915, being 35,776 below the average for the year 1915. It was this reduction, effected by laying off large numbers of men in the construction and unskilled labor classes, accompanied by increases in the rate of wages fully in effect in 1915, that accounts for an increase in the average pay to \$825 per year from \$749 in 1914. This comparison is not strictly accurate because in 1914 the divisor was the number of persons employed June 30th. From this time on we will be able to make accurate comparisons of yearly pay from fixed data.

The student will observe how illusive is any relation between the average pay of railway employes per hour and the average per year. He will see one class receiving 66 cents per hour, averaging \$1,574 per year, while another class getting 53 cents per hour averaged \$1,690 per year; and a little further on appear two classes averaging 42 cents an hour but averaging \$1,118 and \$1,521 per year respectively. It is all a matter of the number of hours worked. Clerks of the \$900 class average under nine hours a day, whereas your general foreman generally works over ten hours a day.

In order to couple up the new system with the old as nearly as possible, it is necessary to adopt *ten hours* as the average railway day. This yields an average daily compensation of \$2.68 in 1915 against \$2.54 in 1914, or an increase of 14 cents per day. For reasons already given, this does not mean that there was an actual average increase of 14 cents per day per employe, which would have aggregated over \$66,000,000 for the year, but that owing to the concurrence of wage increases with the reduction of forces in the lower paid ranks the average compensation necessarily advanced materially.

The aggregate number of hours worked by the employes of the 448 roads reporting to this Bureau in 1915 was 4,752,224,000. On the basis of ten hours per day this represented 475,222,400 days worked against 539,187,000 in 1914. This yields an average of 308 days per year per person for 1915, against 319 in 1914 and 304 in 1913. These averages justify the acceptance of ten hours as an arbitrary factor in fixing the relation of the railway hour to the railway day. With this explanation we reproduce here the table relating to "Employes and Their Compensation" as it appeared in the *Statistics* for 1914, with the totals for 1915 readjusted as nearly as practicable to the abandoned system:

SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF PAY BY CLASSES IN 1915, AND TOTALS FROM 1889 TO 1915.

1914 (245,894 Miles Represented) Class	Number June 30	Per 100 Miles of Line	Compensation		
			Total	Average Pay per Day	Per Cent of Gross Revenues
General Officers	3,905	1.6	\$ 20,300,232	\$16.11	0.6
Other Officers	10,685	4.3	23,821,324	6.49	0.8
General Office Clerks	86,502	35.2	75,225,019	2.53	2.5
Station Agents	37,822	15.4	31,217,225	2.37	1.0
Other Station Men	168,358	67.3	110,211,575	1.99	8.6
Enginemen	61,698	25.1	108,602,949	5.28	3.6
Firemen	65,001	26.4	66,736,996	3.23	2.2
Conductors	47,870	19.5	72,920,026	4.49	2.4
Other Trainmen	136,562	55.6	139,526,685	3.11	4.6
Machinists	56,202	22.9	58,059,236	3.28	1.9
Carpenters	72,194	29.4	60,061,063	2.67	2.0
Other Shopmen	256,254	104.2	191,019,044	2.37	6.3
Section Foremen	43,900	17.9	33,563,410	2.20	1.1
Other Trackmen	330,678	134.5	144,148,253	1.69	4.7
Switch Tenders, Crossing Tenders and Watchmen	38,218	15.5	23,102,844	1.72	0.8
Telegraph Operators and Dispatchers	40,052	16.3	36,062,095	2.56	1.2
Employees acct. Floating Equip.	12,986	5.2	9,466,840	2.40	0.3
All Other Employees & Laborers	232,986	94.8	169,004,994	2.22	5.5
Total (97% Mileage Represented) Bureau	1,698,818	691.1	\$1,373,040,811	\$ 2.54	45.14
Ditto, 1915	1,506,438	623.6	1,272,392,851	2.48	43.26
1914 Official(a)	1,740,226	673	\$1,404,092,440	(b) \$ 2.54	45.09
1913 " (a)	1,964,308	730	1,405,080,826	2.49	43.99
1912 " (a)	1,748,380	695	1,274,347,697	2.44	44.06
1911 " (a)	1,702,164	660	1,230,186,019	2.42	43.32
1910 " (a)	1,732,485	715	1,165,444,865	2.29	41.58
1909 " (a)	1,528,808	645	1,005,349,968	2.24	40.86
1908 " (a)	1,458,244	628	1,051,632,225	2.25	43.26
1907 "	1,672,074	735	1,072,386,427	2.20	41.42
1906 "	1,521,385	684	930,801,653	2.09	40.02
1905 "	1,382,196	637	839,944,680	2.07	40.94
1904 "	1,296,121	611	817,598,810	No data	41.39
1903 "	1,312,537	639	776,321,415	No data	40.78
1902 "	1,189,315	594	676,028,592	No data	39.16
1901 "	1,071,189	548	616,713,701	No data	38.40
1900 "	1,017,653	529	577,264,941	No data	38.82
1899 "	928,924	495	522,967,896	No data	39.81
1898 "	874,558	474	495,055,618	No data	39.70
1897 "	823,476	449	465,601,581	No data	41.50
1896 "	826,620	454	468,824,531	No data	40.77
1895 "	785,034	441	445,508,261	No data	41.43
1894 "	779,608	444	No data	No data	No data
1893 "	873,602	515	No data	No data	No data
1892 "	821,415	506	No data	No data	No data
1891 "	784,285	486	No data	No data	No data
1890 "	749,301	479	No data	No data	No data
1889 "	764,743	459	No data	No data	No data

(a) Revised to include switching and terminal company employees (excepting last column) omitted from official figures since 1908.

(b) Bureau computations.

ENGINEMEN AND TRAINMEN PAID ON MILEAGE BASIS.

In 1915 for the first time the Commission required the roads to report the number of hours on duty, the number of miles actually run, the number of constructive miles allowed and the compensation of enginemen and trainmen on a mileage basis. The returns were naturally very incomplete and add nothing to the information furnished in the preceding table. There is little uniformity in the reports—some giving the constructive miles allowed and others ignoring them altogether. As a general rule the number of hours on duty given under this basis coincided with that given under the general subject. From such incomplete returns as were received, we have summarized the following:

Class of Employees	Number of Hours on Duty	Number of Miles Actually Run	Number of Constructive Miles Allowed	Compensation	Average Pay per 100 Miles
52 Road Freight Engineers and Motormen	54,073,538	504,242,213	82,999,677	\$33,912,278	\$6.73
53 Road Freight Firemen and Helpers	54,843,270	504,724,919	82,624,862	21,623,762	4.28
54 Road Freight Conductors ..	42,985,043	411,858,496	75,041,695	21,933,593	5.34
55 Road Freight Brakemen and Flagmen	102,825,473	947,341,287	173,916,775	35,284,940	3.72
56 Road Passenger Engineers and Motormen	19,803,956	397,417,799	31,461,613	18,556,909	4.67
57 Road Passenger Firemen and Helpers	19,494,219	392,254,996	31,546,725	11,051,271	2.82
58 Road Passenger Conductors ..	13,566,903	297,715,965	34,270,404	9,920,007	3.33
59 Road Passenger Baggage-men	8,216,703	174,831,555	26,154,732	3,232,939	1.85
60 Road Passenger Brakemen and Flagmen	17,839,889	377,060,663	37,711,850	7,024,059	1.86
61 Other Trainmen	4,416,779	49,035,008	8,389,127	1,402,583	2.86

Anything like satisfactory analysis of the figures in this table is precluded by the lack of uniformity in the reports behind it. In a general way it proves that trainmen in the freight service run 9.2 miles per hour on duty, whereas passenger trainmen average 20 miles per hour. But where he actually runs 9.2 miles per hour the freight trainman gets pay for running 10.8 miles and the passenger trainman gets paid for 21.6 miles when he only runs 20. When figured out on an hourly basis it appears that trainmen paid on the mileage basis average slightly more than the average of all on the former basis. But until the returns are more complete and uniform all deductions from these figures have to be made with great reserve.

AVERAGE COMPENSATION 1914-1892.

In order to preserve the data respecting the pay of railway employes which has been accumulating since 1892, for the purposes of reference if not comparison, the following statement of average daily compensation by classes revised to 1914 is herewith reproduced from the *Statistics* of last year. It will be twenty years at least before the present system can offer any such study of the railway problem always knocking at the cashier's window as is provided by this table:

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYES, BY CLASSES, FOR THE YEARS ENDING JUNE 30, 1914, TO 1892.

Year	General Officers	Other Officers	General Office Clerks	Station Agents	Other Stationmen	Enginemen	Firemen	Conductors	Other Trainmen	Machinists	Carpenters	Other Shopmen	Section Foremen	Other Trackmen	Switchmen, Flagmen and Watchmen	Telegraph Operators and Despatchers	Employees Account Floating Equipment	All Other Employees and Laborers
1914* Official	\$ 16.06	\$ 6.48	\$ 2.54	\$ 2.33	\$ 1.98	\$ 5.24	\$ 3.22	\$ 4.47	\$ 3.09	\$ 3.27	\$ 2.66	\$ 2.36	\$ 2.20	\$ 1.59	\$ 1.71	\$ 2.56	\$ 2.35	\$ 2.20
1913†	15.67	6.44	2.51	2.28	1.96	5.20	3.13	4.39	3.04	3.26	2.63	2.31	2.14	1.58	1.70	2.52	2.37	2.15
1912†	13.13	6.32	2.50	2.20	1.89	5.00	3.02	4.29	2.96	3.21	2.55	2.24	2.09	1.50	1.70	2.47	2.37	2.10
1911†	12.99	6.27	2.49	2.17	1.89	4.79	2.94	4.16	2.88	3.14	2.54	2.24	2.07	1.50	1.74	2.44	2.34	2.08
1910†	13.27	6.22	2.40	2.12	1.84	4.55	2.74	3.91	2.69	3.08	2.51	2.18	1.99	1.47	1.69	2.33	2.22	2.01
1909†	12.67	6.40	2.31	2.08	1.82	4.44	2.67	3.81	2.59	2.98	2.43	2.13	1.96	1.38	1.73	2.30	2.31	1.98
1908†	13.11	6.27	2.33	2.09	1.82	4.45	2.64	3.81	2.60	2.95	2.40	2.12	1.95	1.45	1.75	2.30	2.38	1.97
1907	11.93	5.99	2.30	2.05	1.78	4.30	2.54	3.69	2.54	2.87	2.40	2.06	1.90	1.46	1.87	2.26	2.27	1.92
1906	11.81	5.82	2.24	1.94	1.69	4.12	2.42	3.51	2.35	2.69	2.28	1.92	1.80	1.36	1.80	2.13	2.10	1.83
1905	11.74	6.02	2.24	1.93	1.71	4.12	2.38	3.50	2.31	2.65	2.25	1.92	1.79	1.32	1.79	2.19	2.17	1.83
1904	11.61	6.07	2.22	1.93	1.69	4.10	2.35	3.50	2.27	2.61	2.26	1.91	1.78	1.33	1.77	2.15	2.17	1.82
1903	11.27	5.76	2.21	1.87	1.64	4.01	2.28	3.38	2.17	2.50	2.19	1.86	1.78	1.31	1.76	2.08	2.11	1.77
1902	11.17	5.60	2.18	1.80	1.61	3.84	2.20	3.21	2.04	2.36	2.08	1.78	1.72	1.25	1.77	2.01	2.00	1.71
1901	10.97	5.56	2.19	1.77	1.59	3.78	2.16	3.17	2.00	2.32	2.06	1.75	1.71	1.23	1.74	1.98	1.97	1.69
1900	10.45	5.22	2.19	1.75	1.60	3.75	2.14	3.17	1.96	2.30	2.04	1.73	1.68	1.22	1.80	1.96	1.92	1.71
1899	10.03	5.18	2.20	1.74	1.60	3.73	2.10	3.13	1.94	2.29	2.03	1.72	1.68	1.18	1.77	1.93	1.89	1.68
1898	9.73	5.21	2.25	1.73	1.61	3.72	2.09	3.13	1.95	2.28	2.02	1.70	1.69	1.16	1.74	1.92	1.89	1.67
1897	9.54	5.12	2.18	1.73	1.62	3.65	2.05	3.07	1.90	2.23	2.01	1.71	1.70	1.16	1.72	1.90	1.86	1.64
1896	9.19	5.96	2.21	1.73	1.62	3.65	2.06	3.05	1.90	2.26	2.03	1.69	1.70	1.17	1.74	1.93	1.94	1.65
1895	9.01	5.85	2.19	1.74	1.62	3.65	2.05	3.04	1.90	2.22	2.03	1.70	1.70	1.17	1.75	1.98	1.91	1.65
1894	9.71	5.75	2.34	1.75	1.63	3.61	2.03	3.04	1.89	2.21	2.02	1.69	1.71	1.18	1.75	1.93	1.97	1.65
1893	7.84	...	2.23	1.83	1.65	3.66	2.04	3.08	1.91	2.33	2.11	1.75	1.75	1.22	1.80	1.97	1.96	1.70
1892	7.62	...	2.20	1.81	1.68	3.68	2.07	3.07	1.89	2.29	2.08	1.71	1.76	1.22	1.78	1.93	2.07	1.67

*Pay of general officers in 1913 and 1914 out of proportion because returns do not include Class IH roads. Other officers included under General officers in 1892 and 1893.

†Averages do not include returns for switching and terminal companies since 1908.

Mark that according to this table the pay of engineers in twenty years has increased from \$3.61 per day to \$5.24, or over 45%; that of firemen from \$2.03 to \$3.22, or over 58%; that of conductors from \$3.04 to \$4.47, or over 47%; and that of other trainmen from \$1.89 to \$3.09, or over 63%. Now turn back to the table for 1915, where it appears that the average pay for the fourteen classes into which trainmen are there divided runs from \$825 per year up to \$2,041, and it is easy to understand why they are known as the Aristocrats of the Labor World. And these classes are now asking for an advance of 25% under the guise of a demand for an eight-hour day.

RATIO OF PAY OF EMPLOYEES TO REVENUES.

In the next statement the ratio of the aggregate compensation of railway employes to total operating revenues and expenses is given, together with the telltale ratio of expenses and taxes to revenues since 1895:

SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYEES TO GROSS EARNINGS AND OPERATING EXPENSES, AND OPERATING RATIO FOR TWENTY YEARS, 1915 TO 1895.

Year	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio Expenses and Taxes to Gross Earnings
1915 Bureau.....	43.20%	61.33%	75.16%
1914 Official.....	45.09%	62.37%	(a) 76.83%
1913 ".....	*43.99%	*63.29%	(a) 73.52%
1912 ".....	44.06%	63.49%	73.62%
1911 ".....	43.32%	63.10%	72.54%
1910 ".....	41.58%	62.75%	70.06%
1909 ".....	40.86%	61.79%	69.90%
1908 ".....	43.26%	62.02%	73.28%
1907 ".....	41.42%	61.33%	70.63%
1906 ".....	40.02%	60.56%	69.29%
1905 ".....	40.34%	60.40%	69.32%
1904 ".....	41.39%	61.07%	70.91%
1903 ".....	40.78%	61.65%	69.20%
1902 ".....	39.16%	60.56%	67.81%
1901 ".....	38.40%	59.27%	68.06%
1900 ".....	38.82%	60.04%	67.90%
1899 ".....	38.81%	61.03%	68.77%
1898 ".....	39.70%	60.52%	69.09%
1897 ".....	41.50%	61.87%	70.90%
1896 ".....	40.77%	60.65%	70.68%
1895 ".....	41.43%	61.38%	71.18%

(a) Class I and II roads only. The Commission did not report the taxes of Class III roads for 1913 and 1914. *Class III roads wages estimated in 1913.

The ratio of the cost of labor to railway revenues is still far above the margin of safe economic operation, which experience has shown to be in the neighborhood of 40%. The operating ratio is made up of 70.44% for operating expenses proper and 4.72% for taxes. This latter is the highest on record. The taxes themselves have not shown a very great increase, but the fund out of which they are paid was smaller.

FOREIGN RAILWAY LABOR AND PAY.

Statistics of foreign railways, and more particularly those relating to the number and pay of employes, have been seriously upset by the European war. Out of 643,135 railway employes in the United Kingdom, over 140,000 men have joined the army and large numbers of women have taken their places. The same conditions prevail on both sides of the trenches in Europe. In the United Kingdom, and presumably on the continent, the wages of railway employes have been raised to meet the widespread advance in the cost of provisions.

The first table under this head gives the number and pay of European railway "servants" as far as the information from official sources is available:

SUMMARY SHOWING NUMBER OF EMPLOYES, COMPENSATION AND AVERAGE YEARLY PAY OF THE PRINCIPAL EUROPEAN COUNTRIES AND OF JAPAN.

Country	Miles of Railway	Employes, Number	Compensation per Year	Average per Year	Ratio to Revenues
*United Kingdom (1913)	23,601	643,135	\$170,088,613	\$379	27.2
German Empire (1913)	37,894	786,466	321,639,536	409	38.0
Austria (1912)	14,185	280,220	92,439,338	330	40.1
Hungary (1912)	13,303	147,194	44,218,935	300	38.8
Russia (1910)	41,622	771,938	163,149,009	211	32.7
France (1908)	24,915	442,709	115,125,400	260	34.4
Italy (State, 1912)	8,887	148,569	52,657,655	354	45.2
Switzerland (All, 1913)	3,148	45,386	16,697,901	368	33.5
†Denmark (State, 1914)	2,333	13,198	4,644,727	352	30.7
Sweden (1912)	8,659	48,330	18,578,561	384	42.8
Roumania (1914)	2,200	34,422	8,523,168	248	38.4
Belgium (State, 1911)	2,926	70,364	17,991,907	256	29.7
Japan (1914)	5,348	112,087	12,655,621	113	22.3

*Of British railway employes; 49,584 are classed as boys, and the compensation does not include administrative staff.

†Excludes laborers.

‡Census 1913, latest reported.

Comparison of the American average of \$825 per employe with the average paid annually to foreign railway employes shown in this table affords a contrast upon which the student of the American railway problem may profitably ponder.

PAY OF BRITISH RAILWAY EMPLOYEES.

The effect of the bonus of 75 or 50 cents a week, according to rank, awarded to British railway employes shortly after the outbreak of the war, recently increased to \$1.20 a week for all classes, is not shown in any of the British Board of Trade reports so far at hand. Therefore we have to fall back on the following compilation from the *Railway News*, London, for the number and compensation of British railway employes for a normal week:

Period	Number Employed in Selected Week	Amount Paid in Wages in Selected Week	Average Weekly Earnings per Employe	
First Week in December,		£	s	d
1912.....	482,905	660,196	27	4½
1911.....	473,168	631,321	26	8½
1910.....	463,520	596,609	25	9
1909.....	459,968	583,104	25	4½
1908.....	459,763	574,455	25	0
1907.....	479,314	618,734	25	9½
1906.....	458,579	582,699	25	5
1905.....	449,923	568,852	25	3½
1904.....	446,197	558,416	25	0½
1903*.....	448,944	558,419	24	10½
1902.....	449,068	559,179	24	11½

*Second week in December, 1903.

The larger bonus granted in 1914 went to the men receiving the smaller wages and the two shillings a week to those receiving above a certain average. The revised bonus of five shillings a week goes to all classes. The government assumes 87½% of this increase and the companies 12½%. It is estimated that this bonus will add \$25,000,000 at least to the pay of British railway employes.

NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES.

Official statistics of the German Empire give the number and compensation of the four main classes into which its railway employes are divided for the calendar year 1913, as follows:

SUMMARY SHOWING NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES FOR THE YEAR ENDING DECEMBER 31, 1913.

Division	Employees, Number	Compensation (Total)	Average per Year	Increase Over 1907
General Administration.....	35,040	\$ 27,988,518	\$799	\$46
Maintenance and Guarding Road	187,662	51,031,786	272	36
Station Service and Train Crews.....	342,644	142,925,966	417	57
Switching Crews and Shops.....	221,120	99,693,266	451	67
Total	786,466	\$321,639,536	\$409	\$57
Per Mile of Line	20.77			

From this it appears that the average yearly pay of the German railway "servant" is less than half that of the American railway employe.

EMPLOYEES OF FRENCH RAILWAYS.

Official statistics of French railways give the number, but not the compensation of their employes, except for the department of "motive power" (*traction et materiel*). The latest figures, for 1910 and 1911, follow:

Department	1910	1911
General Administration.....	3,257	3,241
Transportation and Traffic.....	149,050	153,165
Motive Power.....	97,660	102,178
Way and Structures.....	89,065	91,137
Auxiliaries and Laborers.....	87,006	82,164
Female Employees.....	30,619	30,705
Total	456,657	462,590

In the department of motive power the compensation of employes was approximately \$21,315,116, or \$208.63 per employe yearly, against \$187.50 in 1908.

AUSTRIAN RAILWAY EMPLOYEES, 1912.

While the number of Austrian railway employes has remained practically stationary since 1908, their compensation has steadily increased. The total pay roll has advanced over 29%, as appears in the following summary:

	Number	Compensation	Average Pay
Appointed Staff, 1912	140,871	\$64,325,731	\$456
Laborers on Daily Pay, 1912	139,349	28,113,607	202
Total, 1912.....	280,220	\$92,439,338	\$330
" 1911.....	276,943	89,061,382	322
" 1910.....	277,619	81,001,618	294
" 1909.....	279,034	77,230,083	277
" 1908.....	274,937	71,355,596	260

Even at the advanced rates, the pay of Austrian railway men is only 40% of that of their American brothers.

HUNGARIAN RAILWAY EMPLOYEES.

Hungarian railway employees in 1912 were distributed into divisions and classes as follows:

Branch of Service	Officials	Other Officers		Workmen	Total
		Male	Female		
General Administration.....	1,048	784	156	72	2,060
Track Inspection and Maintenance	1,112	12,322	6	39,305	53,745
Traffic Service.....	5,505	40,121	600	10,487	56,713
Train Despatching and Workshops.....	1,059	12,973	12	19,399	33,443
Material and "Inventariendienst".....	330	637	7	1,259	2,233
Total, 1912.....	9,054	66,837	781	70,522	147,194
Total, 1911.....	8,717	62,238	781	64,598	136,324

In their pay a different classification prevails as follows:

Branch of Service	On the State Roads and Roads Worked by the State	On Private Roads Privately Worked	All Railways	Yearly Average
General Administration.....	\$ 978,003	\$ 326,518	\$ 1,304,521	\$333
Track Inspection and Maintenance	8,014,794	1,329,870	9,344,664	177
Traffic Service.....	17,096,019	2,659,833	19,755,852	348
Train Despatching and Workshops.....	11,255,090	1,862,180	13,117,270	392
Material and "Inventariendienst".....	662,124	44,504	606,628	312
Total, 1912.....	\$37,996,030	\$ 6,222,905	\$44,218,935	\$300
Total, 1911.....	\$33,880,798	\$ 5,624,688	\$39,505,486⁷	\$290

To meet this advance in pay the railways of Hungary have advanced their rates.

RUSSIAN RAILWAY EMPLOYEES.

Russian railway statistics for 1910 show that there has been a decline in the number and compensation of employes since 1907, accompanied by an increase in average pay per year, as appears from the following summary:

Branch of Service	Number	Compensation	Average per Year
Russia in Europe—			
Officials and Regular Staff	306,510	\$ 69,736,457	\$228
Day Laborers.....	161,960	26,453,353	163
Russia in Asia—			
Officials and Regular Staff	61,369	16,925,813	276
Day Laborers.....	35,596	7,077,607	199
Private Companies—			
Officials and Regular Staff	126,965	30,066,318	237
Day Laborers.....	73,808	10,935,696	148
Total, 1910.....	766,208	\$161,184,644	\$211
Total, 1909.....	792,544	\$160,479,859	\$202
Total, 1907.....	836,035	169,842,700	203

Note.—Excludes purely local roads among private companies.

SWISS RAILWAY EMPLOYEES.

The official statistics of Switzerland for 1913 show that there has been a material increase in the number and compensation of railway employes in that thrifty republic. This has been accompanied by an advance in passenger rates, which, for the most part, the tourists pay:

PAY OF SWISS RAILWAY EMPLOYEES, 1913.*

Division	Employes, Number	Compensation (Total)	Average per Year	Average in 1907
General Administration.....	1,643	\$ 998,007	\$607.48	\$486
Maintenance and Inspection	10,529	1,663,900	158.03	144
Transportation and Train Service.....	19,784	9,634,609	486.96	389
Motive Power and Supplies.....	13,430	4,401,295	327.72	267
Total in Operating Service.....	45,386	\$16,697,901	\$367.91	\$297
Incidental Operations.....	352			
Grand Total.....	45,738			

*For 1914 figures see section on Foreign Railways.

ITALIAN RAILWAY EMPLOYEES.

For 1912 the government report furnishes the following information regarding the number and pay of Italian railway employees:

Branch of Service	Number	Compensation	Average per Employee
General Administration.....	7,123	\$ 3,729,155	\$523
Movement and Traffic	56,191	21,459,870	382
Motive Power and Supplies.....	37,598	16,641,748	443
Maintenance and Guarding	47,657	10,826,882	227
Total	148,569	\$52,657,655	\$354
Per Mile of Line	18		

These figures of the number and pay of Italian railway employees will come as a surprise to those students under the impression that they were among the lowest paid railway employees in Europe.

DANISH STATE RAILWAYS.

Beyond the number of employed in the several departments and the total compensation of all employees, the railway statistics of Denmark furnish little information respecting the working force of Danish railways. The figures for 1914 were as follows:

Branch of Service	Number	Compensation	Average per Employee per Year
General Direction.....	169		
Traffic Department.....	5,724		
Road Department.....	2,591		
Mechanical Department.....	4,454		
Accounting Department.....	260		
Total.....	13,198	\$4,644,727	\$353
Per Mile of Line.....	10.35		

This shows a decrease in number employed but an increase in total compensation.

BELGIAN RAILWAY EMPLOYEES.

Official reports of the Belgian railways for the year 1912 are as follows:

Branch of Service	State Roads 2,696 Miles	Private Roads 217 Miles
Officials and Permanent Staff	10,472	1,185
Under Officials and Assistants	3,432	3,679
Laborers	58,008	
Total	71,907	4,864
Per Mile of Line	26.67	22.41

Since the summer of 1914 almost the entire system of Belgian railways has been taken over by the German government and brought in close co-operation with the military requirements of Berlin in contradistinction to the industrial interests of Brussels and Antwerp.

SWEDISH RAILWAY EMPLOYEES.

The railway employes of Sweden are among the best paid in Europe, as the following summary shows:

SUMMARY SHOWING NUMBER AND PAY OF SWEDISH RAILWAY EMPLOYEES IN 1912.

Division	Employees, Number	Compensation (Total)	Average per Year
General Administration	820	\$ 642,120	\$783
Way and Structures	14,120	4,266,234	302
Machinery—Line Service	10,622	4,515,044	425
Shop Service	5,545	1,774,601	320
Transportation	17,223	7,380,562	429
Total	48,330	\$18,578,561	\$384
Per Mile of Line	5.55		

A survey of the field of European railway labor emphasizes the fact that before the war the average pay of railway employes was less than \$1.00 a day. This may be compared with \$2.68 a day, which is the present average of American railway employes.

RAILWAY EMPLOYEES IN JAPAN.

The pay of railway labor in Japan affords an interesting contrast in the industrial conditions prevailing on the Western shore of the Pacific to those with which we are familiar on this side. The difference roughly is in proportion of one to seven and a quarter, as the next summary shows:

	Number	Monthly Salary	Average per Capita Monthly
"Higher Grade Officials"—			
Chokunin Rank.....	19	\$ 3,296	\$173.47
Sonin Rank.....	431	31,621	73.37
"Lower Grade Officials"—			
Clerks.....	{ *4	53	14.25
	4,522	99,728	22.05
Assistant Engineers.....	2,175	57,721	26.54
Foremen.....	695	13,063	18.83
Employees.....	{ *761	3,502	4.60
	27,325	266,676	9.76
Laborers.....	{ *2,866	8,748	3.05
	73,289	570,207	7.78
Total.....	112,087	\$1,054,635	\$ 9.41

*Female.

Only in India and China does anything like such low average compensation for railway labor prevail, and it is this that accounts for the small operating ratio on Japanese railways.

THE COST OF LIVING.

In the continuous cycle of demands for increased compensation for railway labor coming under the writer's statistical view for the past decade, such demands have always eventually rested on the increased cost of living. When these demands have been submitted to arbitration, the hazards, hardships and responsibilities of the industry have been paraded before the arbiters to arouse public sympathy notwithstanding the fact that these elements have been considered and discounted in railway employment long before the Interstate Commerce Commission began to collect and compile comparative data on the subject. Individually the railway employe contributes no more to the efficiency and safety of railway operation than he did a generation ago. He pursues his occupation under safer and more agreeable conditions, which are undergoing a constant process of amelioration. If his labors are attended with larger results it is

because the instruments he works with are better designed and equipped. These are provided at the cost of capital and in no sense do they add to the burden of labor.

Therefore when railway employes come to the final show down over a raise in wages, whether in negotiation or arbitration, the advance in the cost of living is the final and winning card.

In the preceding pages it has been shown how the average compensation of railway employes since 1905 has increased nearly 30% while in twenty years that of engineers, the bellwethers of railway workers, increased over 45%; of firemen over 58%; of conductors over 47% and of "other trainmen" over 63%.

WHAT OFFICIAL FIGURES SHOW.

Now there is no better index to the cost of living than that furnished by the Bureau of Labor in its reports on retail prices. Through an exhaustive investigation in 1903, Carroll D. Wright, then Commissioner of Labor, arrived at the conclusion that in families with an income of from \$800 to \$900 a year 41.37% was expended for food. It hardly needed this to establish the fact that food sets the pace for the cost of living for all who earn their wages or salaries in the sweat of their faces. In the light of these facts, the next summary, giving the Retail Prices from 1890 to 1915, is presented:

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN
1890 TO 1907 THE AVERAGE PRICE 1890-1899=100%. SINCE 1907

Year or Month	All Articles Com- bined	Sirloin Steak	Round Steak	Rib Roast	Pork Chops	Bacon, Smoked	Ham, Smoked	Lard, Pure
1890.....	102.0	99.3	97.6	98.7	96.5	96.5	98.3	98.5
1891.....	103.6	99.7	98.0	99.6	96.8	97.2	99.5	100.0
1892.....	101.7	99.6	98.0	99.6	101.1	99.9	101.5	104.4
1893.....	104.6	99.4	98.5	98.4	106.0	108.9	107.1	119.2
1894.....	99.5	98.1	97.4	97.9	100.9	102.5	101.7	106.4
1895.....	97.2	98.7	98.2	97.9	99.7	98.7	98.9	99.8
1896.....	94.9	98.8	100.5	99.4	97.8	96.3	96.5	92.1
1897.....	96.4	99.6	101.8	100.1	97.5	97.0	98.5	89.0
1898.....	99.4	102.1	102.8	102.2	99.7	100.2	97.2	93.5
1899.....	100.6	104.4	107.0	106.1	108.2	102.9	100.5	97.1
1900.....	102.9	107.1	109.8	109.3	108.9	110.3	106.9	104.9
1901.....	109.5	109.4	114.0	112.7	119.0	121.3	111.1	119.6
1902.....	116.8	114.6	122.3	118.6	127.8	135.9	120.6	135.6
1903.....	116.9	110.6	116.8	117.0	126.1	140.4	122.1	126.0
1904.....	118.3	111.0	120.8	117.0	123.1	138.5	119.4	116.3
1905.....	118.3	110.6	120.0	116.2	125.0	139.3	119.4	115.8
1906.....	122.4	114.2	124.4	120.5	135.9	150.5	127.8	127.3
1907.....	128.0	116.7	128.4	123.0	140.9	157.7	131.0	133.5
1907.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1908.....	102.8	102.4	104.5	102.6	102.3	103.5	102.4	99.8
1909.....	108.2	107.1	108.1	106.8	111.3	111.6	108.3	111.7
1910.....	113.4	112.3	114.4	111.2	123.3	127.2	120.6	128.6
1911.....	112.2	112.7	115.6	111.4	115.7	122.9	117.9	109.9
1912.....	118.9	127.3	131.3	123.0	122.7	121.8	119.5	116.0
1913.....	122.1	139.9	147.1	131.4	134.6	134.6	132.1	123.9
1914.....	124.5	143.3	155.4	135.5	140.8	137.0	134.2	122.2
1914								
January.....	125.8	138.9	149.9	131.8	132.6	131.9	129.6	123.5
February.....	122.2	139.2	150.6	132.8	134.7	132.2	130.1	123.2
March.....	120.0	139.3	150.8	132.7	134.2	132.4	130.3	122.7
April.....	117.8	139.9	151.8	133.6	138.9	133.4	130.5	122.3
May.....	118.9	142.3	153.9	134.7	142.8	133.5	131.0	121.8
June.....	121.1	144.7	156.1	135.9	138.5	134.5	132.6	120.8
July.....	124.9	148.7	160.6	138.5	143.1	136.5	136.5	120.8
August.....	130.2	153.3	165.8	141.9	160.8	143.5	142.7	122.4
September.....	130.8	149.6	162.0	138.6	151.8	144.7	142.7	122.7
October.....	128.1	144.4	157.2	136.3	147.7	142.7	139.0	121.9
November.....	127.8	140.5	154.6	134.9	139.8	140.5	134.6	122.7
December.....	126.9	140.7	152.0	133.1	124.9	138.4	131.7	120.8
1915								
January.....	124.7	140.4	149.2	132.8	118.3	135.6	130.2	121.0
February.....	122.6	137.6	147.6	131.4	114.0	132.9	127.5	119.8
March.....	119.7	136.1	144.5	130.1	114.0	131.5	124.8	119.8
April.....	121.4	139.0	147.6	131.4	126.7	131.5	124.8	118.5
May.....	123.0	141.9	152.3	132.8	133.8	132.9	126.1	118.5
June.....	123.6	144.7	153.9	135.5	132.4	134.3	127.5	118.5

While the shift in the basic average from "1890-1899 equals 100%" to a specific year, made by the department, has broken the continuity of the percentages in this table, it still affords a most valuable and illuminating study of the movement in prices since 1890. If one could confine his diet to the last five items, and one might do worse, with a little cornmeal thrown in, the advance in food prices since 1907 is below the advance in average wages since that year. Even on all articles since 1907 the advance of 23.6% may be compared with an advance of 21.8% in the average compensation of all railway employes since that year, when wages were boosted all along the line to meet the high cost of living then pleaded with telling effect. It is unfortunate that we have no comparable figures on trainmen of 1915, but those for 1914, before they fully reflected the advances effective in 1913, show a percentage of increase fully equal to that in the cost of food.

WHOLESALE PRICES 1890 TO 1914.

As affecting the cost of living, but not so intimately as Retail Prices, the following summary, giving the wholesale prices of the leading commodities, supplements the last preceding table. It indicates another direction in which the railway cost of living keeps pace in materials with the cost of labor:

RELATIVE WHOLESALE PRICES OF COMMODITIES BY YEARS, 1890 TO 1914, AND BY MONTHS IN 1914 BY GROUPS OF COMMODITIES.

Year or Month	Average Price 1890 to 1899=100									
	Farm Products	Food, etc.	Cloths and Clothing	Fuel and Lighting	Metals and Imple-ments	Lumber and Build- ing Material	Drugs and Chemicals	House Fur- nishing Goods	Miscel- laneous	All Com- modities
1890.....	110.0	112.4	113.5	104.7	119.2	111.0	110.2	111.1	110.3	112.9
1891.....	121.5	115.7	111.3	102.7	111.7	108.4	103.6	110.2	109.4	111.7
1892.....	111.7	103.6	109.0	101.1	106.0	102.3	102.9	106.5	106.2	106.1
1893.....	107.9	110.2	107.2	100.0	100.7	101.9	100.5	104.9	105.9	105.6
1894.....	95.9	99.8	96.1	92.4	90.7	96.3	89.8	100.1	99.8	96.1
1895.....	98.3	94.6	92.7	98.1	92.0	94.1	87.9	96.5	94.5	93.6
1896.....	78.3	83.8	91.3	104.3	93.7	93.4	92.6	94.0	91.4	90.4
1897.....	85.2	87.7	91.1	96.4	86.6	90.4	94.4	89.8	92.1	89.7
1898.....	95.1	94.4	93.4	95.4	86.4	95.8	106.6	92.0	92.4	93.4
1899.....	100.0	98.3	96.7	105.0	114.7	105.8	111.3	95.1	97.7	101.7
1900.....	109.5	104.2	106.8	120.9	120.5	115.7	115.7	106.1	109.8	110.5
1901.....	116.9	105.9	101.0	119.5	111.9	116.7	115.2	110.9	107.4	108.5
1902.....	130.5	111.3	102.0	134.3	117.2	118.8	114.2	112.2	114.1	112.9
1903.....	118.8	107.1	106.6	149.3	117.6	121.4	112.6	113.0	113.6	113.6
1904.....	126.2	107.2	109.8	132.6	109.6	122.7	110.0	111.7	111.7	113.0
1905.....	124.2	108.7	112.0	128.8	122.5	127.7	109.1	109.1	112.8	115.9
1906.....	123.6	112.6	120.0	131.9	135.2	140.1	101.2	111.0	121.1	122.5
1907.....	137.1	117.8	126.7	135.0	143.4	146.9	109.6	118.5	127.1	129.5
1908.....	133.1	120.6	116.9	130.8	125.4	133.1	110.4	114.0	119.9	122.8
1909.....	153.1	124.7	119.6	129.3	124.8	138.4	112.4	111.7	125.9	126.5
1910.....	164.6	128.7	123.7	125.4	128.5	153.2	117.0	111.6	133.1	131.6
1911.....	162.0	131.3	119.6	122.4	119.4	151.4	120.3	111.1	131.2	129.2
1912.....	171.3	139.5	120.7	133.9	126.1	148.2	122.9	113.7	133.2	133.6
1913.....	165.8	137.1	123.7	142.2	127.5	151.8	124.1	118.1	137.1	135.2
1914.....	177	139	122	135	118	146	132	120	134	134
1914										
January ..	172.0	143.0	122.0	139.0	119.0	148.0	126.0	120.0	136.0	135.0
February ..	175.0	138.0	122.0	140.0	120.0	149.0	127.0	120.0	135.0	134.0
March.....	175.0	136.0	122.0	140.0	120.0	148.0	127.0	120.0	135.0	134.0
April	178.0	131.0	122.0	137.0	119.0	148.0	127.0	120.0	135.0	132.0
May	177.0	146.0	122.0	145.0	117.0	147.0	127.0	120.0	135.0	136.0
June.....	174.0	136.0	122.0	134.0	116.0	147.0	128.0	126.0	134.0	133.0
July	172.0	125.0	122.0	134.0	116.0	147.0	128.0	120.0	132.0	132.0
August ...	182.0	141.0	122.0	133.0	116.0	147.0	129.0	120.0	134.0	135.0
September .	188.0	147.0	121.0	133.0	121.0	145.0	136.0	121.0	136.0	137.0
October....	181.0	143.0	126.0	133.0	119.0	145.0	147.0	121.0	131.0	135.0
November..	177.0	145.0	120.0	132.0	116.0	143.0	143.0	121.0	130.0	135.0
December ..	175.0	145.0	119.0	132.0	117.0	142.0	140.0	121.0	131.0	134.0

WAGES ADVANCE WHILE RATES DECLINE.

Applying to the wages paid railway employes and the average receipts from rates the same formula by which the Bureau of Labor arrives at the relative rise and fall in the cost of living enables us to present, in the next summary, a striking contrast between what the railways pay and the rates by which they live:

RELATIVE DAILY WAGES OF OTHER TRAINMEN, OTHER SHOPMEN, OTHER TRACKMEN AND ALL OTHER EMPLOYEES AND LABORERS, 1892 TO 1915, COMPARED WITH AVERAGE FOR THE EIGHT-YEAR PERIOD, 1892 TO 1899, WITH SIMILAR COMPARISON FOR AVERAGE FREIGHT AND PASSENGER RATES.

Year	Relative Rates of Daily Pay				Relative Receipts per Mile	
	Other Trainmen	Other Shopmen	Other Trackmen	Other Employees and Laborers	Per Ton of Freight	Per Passenger
1892 Official.....	98.9	100.0	103.2	100.4	109.5	104.6
1893 ".....	100.0	102.3	103.2	102.2	107.1	103.3
1894 ".....	98.9	98.8	99.9	99.2	104.9	97.7
1895 ".....	99.5	99.4	99.0	99.2	102.3	100.4
1896 ".....	99.5	98.8	99.0	99.2	98.3	99.4
1897 ".....	99.5	100.0	98.1	98.5	97.3	99.6
1898 ".....	102.1	99.4	98.1	100.4	91.8	97.1
1899 ".....	101.5	100.6	99.9	101.6	88.3	97.4
1900 ".....	102.6	101.2	103.2	102.7	88.9	98.3
1901 ".....	104.7	102.3	104.1	101.6	91.4	99.1
1902 ".....	106.8	103.5	105.8	102.7	92.3	97.7
1903 ".....	113.6	108.8	110.8	106.4	93.0	98.7
1904 ".....	118.3	111.7	112.5	109.4	95.1	98.7
1905 ".....	120.6	112.3	111.6	110.0	93.4	96.6
1906 ".....	123.0	112.3	115.1	110.0	91.2	98.3
1907 ".....	133.0	120.5	123.5	118.4	92.6	99.2
1908 ".....	136.1	124.0	122.6	118.4	92.0	95.3
1909 ".....	135.6	124.6	116.7	119.0	93.0	94.0
1910 ".....	140.8	127.5	124.4	120.8	91.8	95.4
1911 ".....	150.8	131.0	126.1	125.0	92.4	97.1
1912 ".....	154.9	131.0	126.9	126.2	90.8	97.8
1913(a) Official.....	159.2	135.1	133.7	129.2	88.9	98.9
1914(a) ".....	161.8	138.0	134.6	132.2	89.4	97.5
1915 Bureau.....	171.7	.....	141.5	.....	90.5	99.8

(a) Official figures cover only class I and II roads in 1913 and 1914.

It is to be regretted that the changes in classification made by the Commission preclude any continuation for 1915 of the computation in regard to "Other shopmen" and "Other employees and laborers," which prior to 1914 next to "Other trackmen" were the most numerous classes of railway labor. The four classes chosen for the comparison were selected because they represented 47% of the total compensation, and the basic period dates from 1892 because that was the first year the Commission compiled the data on daily compensation.

IV

CAPITALIZATION

Next in order in this review of American railways in 1915 comes the question of their capitalization—the sum of their securities issued and outstanding to represent the investment in all the property, roadbed, rights and equipment, irrevocably devoted to public use. Here again, unfortunately, the confusing fingers of innovation have made numerous little changes in classification and denominations that rob the statistics of 1915 of the certitude necessary for anything like exact comparison. Fortunately, however, the Commission's own figures, corroborating those of the Bureau, for 1914 afford the data for the following contrast between the extent and capital cost of American railways and those of Europe:

	Europe	United States*
Miles of line.....	198,554	235,815
Capital cost.....	\$25,059,644,889	\$15,719,696,925
Per mile of line.....	126,211	66,661

*Commission's figures 1914.

The American figures are confined to Class I and II roads. To these should be added 8,440 miles of Class III roads, representing a capital cost of \$197,496,000, or \$23,400 per mile. This would raise the net capital of American roads to \$15,917,192,925 and reduce the capital per mile to \$65,166.

This is the proper figure to set opposite the European capital cost per mile, which includes the low cost railways of Norway and Sweden as well as the high capitalized roads of Great Britain and Belgium.

More impressive than the contrast in the capitalization per mile stand out the absolute facts that against 198,554 miles of European railway, built at a capital cost of \$25,059,644,889, the United States has 244,255 miles with a net capitalization of \$15,917,192,925; or, roughly speaking, 30% more mileage at 40% less capital cost. What makes the achievement all the more amazing is that it was accomplished in the face of wages double the European standard, and rates for money one-fourth higher.

Moreover, the finished product—the railways of the United States—admittedly leads the world in efficiency, service and low freight rates, but that is another story.

CAPITALIZATION IN 1915.

From the returns of the 448 operating companies reporting to this Bureau, covering 247,312 miles of line, of which 188,247 miles were owned and 59,065 miles were leased by the operating companies, the following summary for 1915 has been compiled:

SUMMARY SHOWING CAPITALIZATION OF 448 COMPANIES OPERATING 247,312 MILES OF LINE IN 1915.

Capital stock.....	\$ 7,277,410,880	
Funded debt.....	10,466,466,240	
Receivers' certificates.....	52,362,863	
Total 188,247 miles owned.....		\$17,796,238,983
Rental 59,065 miles \$116,852,303 @ 4½.....		2,596,717,844
Total 247,312 miles operated.....		\$20,392,956,827
Deduction:		
Railway stock owned.....	2,716,852,149	
Funded debt owned.....	1,970,496,754	
Miscellaneous securities owned.....	2,525,950	4,689,874,853
Net capitalization 1915.....		\$15,703,061,974
Net capitalization per mile operated.....		68,495
Net capitalization per mile of track (379,344).....		41,393

The approximation of the capital value of the leased mileage is corroborated by the figures of the gross capitalization of the "Non-operating roads subsidiary to Class I and II roads," given by the Commission for 1914 as \$2,750,014,624. In all the Bureau's computations the full mileage operated is used as the divisor, for the simple reason that it is all represented in the capitalization in the item of rent. The principle may be stated thus: instead of building a few miles of road to a necessary terminal or connection at possibly a prohibitive cost, trackage rights are secured at a rental in lieu of interest on capital.

No allowance is made in the above computation for \$506,856,590, notes of affiliated companies, or \$867,226,223, securities of non-affiliated companies held by the operating companies. Had these been included in the deductions, the net capitalization would have been reduced to \$14,328,999,061, or approximately \$58,000 per mile. The temporary nature of the notes and the uncertain value of the

securities of the unaffiliated companies renders their inclusion in this computation questionable. Their exclusion, however, results in unduly swelling the net capitalization.

CAPITALIZATION OF CLASS I AND II ROADS IN 1914.

From the analysis of the railway capital of Class I and II roads, including the non-operating companies, for the year 1914, as made by the Commission, the following statement has been condensed:

SUMMARY OF RAILWAY CAPITAL IN 1914 FROM THE OFFICIAL REPORT.

Capital stock outstanding.....	\$ 8,680,759,704
Funded debt.....	11,566,541,555
Total railway capital.....	\$20,247,301,257
Total stock and funded debt owned.....	\$ 5,493,428,832
Less items not included in outstanding capital.....	1,005,221,488
Balance to be deducted from capital.....	4,488,207,844
Outstanding in hands of the public.....	\$15,759,093,913
Less assigned to other properties.....	39,396,988
Net amount not held by railway companies.....	15,719,696,925
Average amount per mile of road (235,815 miles represented).....	\$66,661
This consists of stock.....	25,492
This consists of funded debt.....	41,169

According to this analysis there was an increase of \$389,565,479 in railway capital in 1915 over that reported for the preceding year. To the net capital given above for Class I and II roads should be added \$197,496,000 representing 8,440 miles of Class III at an average of \$23,400 per mile. This increases the total to \$15,917,-192,925 and reduces the amount per mile to \$65,166.

GROSS AND NET CAPITAL SINCE 1889.

In the following summary the gross and net capital of the railways of the United States is given by years from the earliest reports to the Commission down to 1915:

SUMMARY OF GROSS RAILWAY CAPITAL, AMOUNT OF RAILWAY SECURITIES OWNED AND NET CAPITALIZATION OF THE RAILWAYS OF THE UNITED STATES, 1915 TO 1889.

Year	Gross Railway Capital	Railway Securities Owned	Net Railway Capital	Net Railway Capital per Mile
1915* Bureau.....	\$20,392,956,827	\$4,689,874,853	\$15,703,081,974	\$63,495
1914†° Official.....	20,247,301,257	4,527,604,332	15,719,696,925	66,661
1913‡° ".....	19,796,125,712	4,465,994,266	15,330,131,446	65,861
1912‡ ".....	19,752,536,264	4,664,935,614	15,087,600,650	63,535
1911‡ ".....	19,208,935,081	4,200,227,511	15,008,707,570	63,944
1910‡ ".....	18,417,132,238	4,078,556,298	14,338,575,940	62,657
1909‡ ".....	17,487,868,935	†3,776,001,202	13,711,867,733	59,259
1908‡ ".....	16,767,544,827	3,933,953,317	12,833,591,510	57,201
1907 ".....	16,082,146,683	3,161,794,135	12,920,352,548	58,298
1906 ".....	14,570,421,478	2,898,480,829	11,671,940,649	54,421
1905 ".....	13,805,258,121	2,638,152,129	11,167,105,992	53,238
1904 ".....	13,213,124,679	2,501,330,601	10,711,794,078	52,099
1903 ".....	12,599,990,258	2,318,391,953	10,281,598,305	51,559
1902 ".....	12,134,182,964	2,208,518,793	9,925,664,171	50,961
1901 ".....	11,688,147,091	2,205,497,909	9,482,649,182	49,925
1900 ".....	11,491,034,960	1,943,050,349	9,547,984,611	51,002
1899 ".....	11,033,954,898	1,601,913,167	9,432,041,731	51,764
1898 ".....	10,818,554,031	1,521,386,255	9,297,167,776	51,856
1897 ".....	10,635,008,074	1,466,936,176	9,168,071,898	51,396
1896 ".....	10,566,865,771	1,501,346,914	9,065,518,857	51,141
1895 ".....	10,346,754,229	1,447,181,534	8,899,572,695	51,206
1894 ".....	10,190,658,678	1,544,058,670	8,646,600,008	50,416
1893 ".....	9,894,625,239	1,563,022,233	8,331,603,006	50,293
1892 ".....	9,686,146,813	1,391,457,053	8,294,689,760	52,348
1891 ".....	9,290,915,439	1,282,925,716	8,007,989,723	50,858
1890 ".....	8,984,234,616	1,406,907,001	7,577,327,615	49,473
1889 ".....	8,573,046,742	1,151,972,901	7,421,073,841	49,998

*Covers 247,312 miles. See above for net capital of all railways.

†Does not include returns for switching and terminal companies.

‡If railway securities owned in 1908 is correct, the amount for 1909 is about \$300,000,000 below what it should be.

*Class I and II roads only, 235,815 miles represented June 30, 1914.

From the above it appears that the capitalization of American railways has increased approximately \$15,000 per mile of line during the past 26 years. In the meantime the capitalization per mile of track has only increased from \$38,911 to \$41,393, or \$2,482. As the installation of block signals and the cost of heavier rails would account for this increase, it is evident that the added capitalization per mile of line represents expenditures for auxiliary track and terminal facilities for which the demand is incessant and insistent.

DISTRIBUTION OF CAPITAL BY GROUPS.

The next summary shows the distribution of the gross railway capital by groups according to the Commission's reports for the years 1890, 1900 and 1910, and as reported to the Bureau for 1915. It is impossible to make such assignment for net capitalization because of the inter-ownership of securities among railways operating in different groups:

SUMMARY OF RAILWAY CAPITAL ON JUNE 30, 1890, 1900, 1910 AND 1915 BY GROUPS.

Territory Covered	1890	1900	1910 240,830 Miles Represented	1915 247,312 Miles Represented
Group I.....	\$ 377,477,302	\$ 472,329,210	\$ 799,627,536	\$ 579,986,950
Group II.....	2,032,242,616	2,337,874,067	3,543,053,383	3,300,470,675
Group III.....	1,309,390,715	1,490,997,662	2,414,370,374	2,159,908,050
Group IV.....	410,704,029	631,863,020	960,183,380	1,299,552,471
Group V.....	742,670,372	903,681,993	1,346,913,136	1,506,719,137
Group VI.....	1,818,588,865	2,024,541,064	3,102,203,094	2,821,312,934
Group VII.....	443,136,450	560,763,313	1,047,244,431	1,245,912,386
Group VIII.....	1,047,274,401	1,395,350,723	2,260,370,943	2,428,185,019
Group IX.....	372,982,285	511,034,132	808,905,131	597,647,312
Group X.....	882,876,385	1,162,599,776	2,134,260,330	1,856,544,049
Total.....	\$9,437,343,420	\$11,491,034,960	\$18,417,132,238	\$17,796,238,983
Less Stocks and Bonds Owned..	1,406,907,001	1,943,050,349	14,078,556,298	4,689,874,853
Net Railway Capital.....	\$8,030,436,419	\$9,547,984,611	\$14,338,575,940	\$13,106,364,130

*Includes \$453,108,804 "other forms of indebtedness" excluded in other years.

†Includes \$36,953,808 assigned to "other properties."

The Bureau's figures for 1915 *do not* include the capitalization of non-operating roads, whose mileage is included in that of the operating roads under agreements, leases, etc., the rental of which at 4½% represents a capitalization of \$2,596,717,844. This should be added to the above net railway capital for 1915, making a total of \$15,703,081,974.

NEW RAILWAY CAPITAL IN 1915.

Where over \$300,000,000 new capital was invested in American railways for extensions, improvements and construction in 1914, the following statement, compiled from the *Commercial and Financial Chronicle*, giving the listing of railroad securities on the New York Stock Exchange, shows that the new money similarly invested in 1915 did not reach \$100,000,000:

RAILWAY INCOME
SHOWING MILEAGE, NET CAPITAL, REVENUES, EXPENSES, TAXES,
FROM OPERATION WITH RATIOS BASED ON REPORTS TO

Year	Miles of Line Op. on which returns apply	Miles of Track Op.	Net Capital (thousands)	Freight Revenue (thousands)	Passenger Revenue (thousands)	Total Revenue inc. Mail, Express, etc. (thousands)	Operating Expenses (thousands)
1889	148,428	191,900	\$7,421,074	\$ 642,433	\$254,040	\$ 964,816	\$ 644,706
1890	156,404	199,876	7,577,328	714,464	260,786	1,051,877	692,093
1891	161,275	207,446	8,007,990	736,794	281,179	1,096,761	731,887
1892	162,397	211,051	8,294,690	799,316	286,806	1,171,407	780,997
1893	169,780	221,864	8,331,603	829,054	301,492	1,220,751	827,921
1894	175,691	229,796	8,646,600	699,491	285,350	1,073,361	731,414
1895	177,746	233,276	8,899,573	729,993	252,246	1,075,371	725,720
1896	181,983	239,140	9,065,519	786,616	266,563	1,150,169	772,969
1897	183,284	242,013	9,168,072	772,849	251,136	1,122,089	752,524
1898	184,648	245,334	9,927,168	876,728	266,970	1,247,325	817,973
1899	187,535	250,143	9,432,042	913,737	291,113	1,313,610	856,968
1900	192,556	258,784	9,547,985	1,049,256	323,716	1,487,044	961,428
1901	195,562	265,352	9,482,649	1,118,543	351,356	1,589,526	1,030,397
1902	200,154	274,195	9,925,664	1,207,229	392,963	1,726,380	1,116,248
1903	205,313	283,821	10,281,598	1,338,020	421,706	1,900,846	1,257,538
1904	212,243	297,073	10,711,794	1,379,003	444,327	1,975,174	1,338,896
1905	216,973	306,796	11,167,106	1,450,773	472,695	2,082,482	1,390,602
1906	222,340	317,083	11,671,941	1,640,387	510,033	2,325,765	1,536,877
1907	227,455	327,975	12,920,353	1,823,652	564,606	2,589,105	1,748,515
*1908	230,494	333,646	12,833,592	1,655,419	566,833	2,393,805	1,669,547
*1909	235,402	342,351	13,711,868	1,677,615	563,609	2,418,677	1,599,443
*1910	240,831	351,767	14,338,576	1,925,553	628,992	2,750,667	1,822,630
*1911	246,238	362,824	15,008,708	1,925,951	657,638	2,789,762	1,915,054
*1912	249,852	371,238	15,087,601	1,968,509	660,373	2,842,695	1,972,416
*†1913	244,418	369,580	15,330,131	2,198,931	695,988	3,125,136	2,169,909
*†1914	247,397	377,102	15,719,697	2,114,698	700,403	3,047,020	2,200,313
1915	||247,312	379,344	15,703,082	2,046,047	653,975	2,945,425	2,074,891

*Figures since 1908, exclude switching and terminal companies.

†Traffic expenses excluded since 1908, amounting to about 2% of gross earnings.

ACCOUNT 1889-1915.

MAINTENANCE AND TRANSPORTATION CHARGES AND NET REVENUES
THE INTERSTATE COMMERCE COMMISSION, 1889 TO 1915.

Taxes (thou- sands)	Ratio Exp. and Taxes to Earnings	Net Operat- ing In- come (thou- sands)	Per- centage on Cap- ital	Mainte- nance of Way and Structures (thousands)	Ratio to Earn- ings	Mainte- nance of Equip- ment (thou- sands)	Ratio to Earn- ings	Trans- portation Expenses (thou- sands)	Ratio to Earn- ings	Year
\$27,590	69.67	\$292,520	3.94	\$144,822	15.01	\$106,709	11.06	\$330,915	34.29	1889
31,207	68.76	328,577	4.33	152,719	14.52	114,039	10.14	354,189	33.67	1890
33,280	69.77	333,159	4.16	153,672	14.01	117,048	10.67	384,385	35.06	1891
34,063	69.57	356,457	4.30	164,189	14.01	128,713	10.99	406,727	34.72	1892
36,514	70.81	356,316	4.27	169,258	13.86	136,876	11.21	435,466	35.67	1893
38,125	71.69	303,822	3.51	143,669	13.39	112,895	10.52	394,513	36.75	1894
39,832	71.18	309,810	3.48	143,976	11.92	113,789	9.42	431,149	35.69	1895
39,970	70.68	337,310	3.72	160,345	13.94	133,982	11.65	422,218	38.45	1896
43,137	70.90	326,428	3.56	159,434	14.20	123,762	10.94	432,526	38.55	1897
43,828	69.09	386,215	4.15	173,315	13.89	142,625	11.43	464,674	37.25	1898
46,337	68.77	410,305	4.35	180,411	13.73	150,919	11.49	486,180	37.01	1899
48,332	67.90	477,284	5.00	211,221	14.20	181,174	12.18	529,116	35.58	1900
50,944	68.06	507,185	5.35	231,057	14.54	190,300	11.98	565,266	35.58	1901
54,465	67.81	555,667	5.59	258,382	14.39	213,381	12.36	609,962	35.33	1902
57,849	69.20	585,450	5.70	266,422	14.01	240,430	12.66	702,510	36.96	1903
61,696	70.91	574,582	5.37	261,280	13.23	267,185	13.53	758,239	38.39	1904
63,474	69.82	628,406	5.63	275,046	13.21	288,441	13.85	771,229	37.03	1905
74,785	69.29	714,103	6.12	311,721	13.40	328,555	14.13	836,203	35.96	1906
80,312	70.63	760,278	5.88	343,545	13.23	368,062	14.22	970,953	37.49	1907
84,555	73.28	639,703	4.98	329,373	13.76	368,354	15.39	868,252	36.27	1908
90,529	69.90	728,705	5.31	308,450	12.75	363,913	15.05	814,088	33.66	1909
103,795	70.06	824,242	5.74	368,507	13.39	413,110	15.02	916,615	33.32	1910
108,310	72.54	766,398	5.31	366,025	13.12	428,367	15.35	987,382	35.39	1911
120,092	73.62	750,187	4.97	367,448	12.92	450,373	15.84	1,019,035	35.84	1912
127,332	73.52	827,825	5.40	421,090	13.47	511,488	16.37	1,096,910	35.07	1913†
140,532	76.83	706,175	4.49	419,278	13.76	532,139	17.46	1,101,597	36.15	1914‡
138,961	75.16	731,568	4.66	377,358	12.81	503,326	17.09	1,028,558	34.92	1915

†Includes only Class I and II roads, i. e., those with revenues of \$100,000 or more.

‡Bureau figures, more than 98% of traffic represented; include switching and terminal roads.

NEW RAILWAY CAPITAL IN 1914 AND 1915.

Security Listed	1914	1915
Steam Railway Bonds—		
For New Construction, Improvements, etc	\$238,376,800	\$ 78,624,500
To Exchange or Retire Other Issues	106,607,000	247,030,000
Total Bonds	\$344,983,800	\$325,655,100
Steam Railway Stocks—		
For New Construction, Improvements, etc	\$ 64,853,700	\$ 12,910,570
To Exchange Other Stocks		350,604,000
To Exchange Voting Trust Certificates	269,384,300	
To Exchange Convertible Bonds	11,778,100	4,312,500
Total Stocks	\$346,016,100	\$367,827,670
Total Stocks and Bonds	\$690,999,900	\$693,482,770
Total New Money for Improvements or Construction	303,230,500	91,535,070

The above table shows that a very large proportion of the railway financing of 1915 was devoted to the retirement or exchange of existing securities. At the opening of the year 1915, it will be remembered, the railways were confronted with something like \$581,000,000 maturing obligations. Against these a little over \$247,000,000 corresponding obligations were marketed. This leaves about \$334,000,000 unaccounted for. What proportion of this balance has been taken up or defaulted has not been reported.

MATURITIES OF RAILWAY OBLIGATIONS.

As revised to date by the Bureau, the future maturities of outstanding railway obligations are as follows:

In 1916	\$ 144,402,238
In 1917	197,192,638
In 1918	82,010,273
In 1919	170,150,433
In 1920	170,540,657
1921 to 1930	1,781,635,496
1931 to 1940	2,014,548,280
1941 to 1950	1,898,877,321
1951 to 1960	2,173,170,563
1961 to 1970	477,166,916
1971 to 1980	8,074,400
1981 to 1990	417,614,500
1991 to 2000	1,132,619,700
Next Century	457,016,280
Total	\$11,125,009,286
Total, Jan. 1, 1915	11,381,067,417
Reduced since Jan. 1, 1915	\$ 256,057,519

This corroborates the retirement of \$334,682,019 of the obligations of 1915, without visible renewals or fresh borrowings, the net reduction for the year, \$256,057,519 being after inclusion of the \$78,624,500 new bonds listed.

CAPITALIZATION OF FOREIGN RAILWAYS.

Nothing in all railway literature contributes to a just appreciation of the marvel of transportation facilities furnished by the railways of the United States more than a comparison of the capital employed in their construction with the capital cost of foreign railways, such as is presented in the following statement from the latest official sources:

SUMMARY OF CAPITALIZATION OF PRINCIPAL FOREIGN RAILWAYS.

Year	Country	Miles Line	Capital or Cost of Construction	Capital per Mile
Europe				
1913	United Kingdom.....	23,691	\$ 6,496,684,076	\$274,324
1913	German Empire.....	37,894	4,580,404,042	120,355
1910	Russian Empire (a).....	41,622	3,508,675,945	84,399
1911	France.....	25,194	3,720,480,021	148,625
1912	Austria.....	14,185	1,724,079,152	121,542
1912	Hungary.....	13,303	949,581,820	71,392
1913	Italy (State Roads only).....	8,439	1,334,928,118	158,185
1909	Spain.....	9,056	729,929,464	89,461
1908	Portugal.....	1,465	162,385,280	110,830
1912	Sweden.....	8,659	300,315,971	33,995
1914	Norway.....	1,948	88,414,229	45,034
1914	Denmark (State Roads only).....	1,216	76,319,972	62,768
1912	Belgium (State Roads only).....	2,696	520,777,053	192,770
1910	Netherlands.....	1,980	163,798,304	82,810
1913	Switzerland.....	3,148	402,351,568	129,762
1914	Roumania.....	2,200	204,591,293	92,996
1911	Serbia (b).....	551	34,882,135	63,307
1913	Bulgaria (State Roads only).....	1,307	61,096,446	46,746
	Total Europe, including Asiatic Russia..	198,554	\$25,059,644,889	\$126,211
Other Countries				
1915	Canada.....	35,582	\$ 2,408,185,013	\$67,737
1912	British India.....	33,484	1,510,187,000	45,101
1910	Argentine Republic (c).....	17,381	868,914,950	49,981
1914	Japan (State).....	5,348	486,545,748	90,977
1915	New South Wales (d).....	4,134	319,390,544	77,263
1914	New Zealand (d).....	2,861	157,569,274	55,075
1915	Queensland (d).....	4,730	172,713,430	35,997
1915	Victoria (d).....	3,848	254,883,503	65,774
1915	Western Australia (d).....	3,096	82,696,067	26,712
1915	South Australia (d).....	2,026	82,677,522	38,337
1915	United States.....	247,312	\$15,703,081,974	\$63,495

(a) Includes Asiatic Russia.

(b) Includes 295 miles narrow gauge.

(c) About two-thirds, 5 ft. 6 in. gauge; remainder, 3 ft. 3½ in. or 2 ft. 6 in. gauge.

(d) New South Wales railways are 4 ft. 8½ in., i. e., standard gauge; New Zealand, Queensland and Western Australia, 3 ft. 6 in.; Victoria, 5 ft. 3 in., except 123 miles 2 ft. 6 in.; and South Australia, 3 ft. 6 in. and 5 ft. 3 in.

If there is any force in comparison, which has been called the right hand of logic, the contrast in the capitalization of the superior railways of America with those of Europe as a whole should forever silence the harpies who harp on the overcapitalization of the railways of the United States. It demonstrates not only that the railways of Europe have cost nearly twice as much per mile as

American railways, but that those of Germany, France, Austria, Belgium and Switzerland afford the same or greater contrasts, while British roads are capitalized at four times the capitalization of our misrepresented roads.

The boasted roads of Germany, built in one of the easiest railway territories in the world, piercing or climbing no mountains, crossing few rivers, constructed with labor paid less than half the American average wage, equipped with locomotives and cars less than half the size of ours, and below the standard of American roads in every physical respect, cost \$120,355 per mile against a capitalization of less than \$64,000 for American railways. Moreover, the cost of German railways has increased nearly \$24,000 per mile in 22 years where that of American railways has increased only \$15,000 in 26 years.

Emulating the example set them by the governments of Europe, the Japanese have more than doubled the capital cost of their government railways since they were acquired by the state in 1908. In that year the 3-foot 6-inch railways of Japan were capitalized at \$42,800 per mile. In 1914 this had risen to \$90,977 per mile and the average wage of railway labor in Japan even now is only \$9.41 per month.

V

COST OF CONSTRUCTION

The more searching requirements as to investment instituted by the Commission in 1907 have resulted in more definite information regarding the first cost of construction and equipment. From the data thus acquired and assembled in a General Balance Sheet for 1914 the following summary has been extracted:

Class I Roads (171,503 miles)—	
Investment in road and equipment prior to June 30, 1907.....	\$ 9,175,437,947
Investment in road and equipment since June 30, 1907.....	4,042,097,391
Advances for construction.....	393,199,363
Working assets less working liabilities.....	1,163,719,949
Total.....	\$14,774,454,650
Class II Roads (18,367 miles)—	
Investment in road and equipment.....	796,500,520
Non-Operating Roads (37,634 miles)—	
Investment in road and equipment.....	2,857,380,680
Total (227,404 miles).....	\$18,428,335,850
Reserved for accrued depreciation.....	\$ 394,736,508
Net investment.....	\$18,033,599,342

As the same authority that furnished the figures for this statement reported 235,558 miles of line owned by the two classes included above, exclusive of 8,440 miles owned by Class III roads and 1,766 miles owned by switching and terminal roads, it is plain that the summary fails to represent the total investment in American railways by the cost of 18,360 miles. As the switching and terminal companies alone reported in 1914 an investment of over \$400,000,000 in road and equipment, and \$30,000 per mile is a conservative estimate for the remaining 16,594, we arrive at about \$900,000,000 as the investment in the roads not included in the above table. This increases the investment in all American railways to nearly \$19,000,000,000.

That this figure is a close approximation of the investment in American railways is corroborated by the following statement compiled from the independent returns to this Bureau for the year ended June 30, 1915, combined with items from the official report for 1914:

COST OF ROAD AND EQUIPMENT FOR THE YEAR ENDED JUNE 30, 1915
(247,312 OPERATED MILEAGE REPRESENTED).

Investment (188,247 miles owned)—	
In road to June 30, 1907.....	\$ 8,277,544,097
In equipment to June 30, 1907.....	1,862,073,697
In road and equipment since July 1, 1907.....	4,513,134,460
<hr/>	
Total investment reported.....	\$14,652,752,254
Non-Operating Roads (37,534 miles)—road and equipment*.....	2,867,380,680
Net working assets*.....	1,163,719,949
<hr/>	
Total investment.....	\$18,673,852,883
Less depreciation*.....	394,736,508
<hr/>	
Net investment to June 30, 1915.....	\$18,279,116,375
*Amounts for these items taken from preceding table for 1914.	

As the mileage represented in this statement falls at least 22,000 miles below the actual physical railway mileage of the United States, and we are justified in putting an arbitrary cost of \$30,000 per mile on that mileage, or \$660,000,000, we arrive at a total of \$18,939,-116,375, or \$76,367 per mile for the 248,000 which is the approximate physical mileage of the railways of the United States today.

When to the cost of nearly \$19,000,000,000 is added the appreciation of railway property in all sections of the country during the past three-quarters of a century, it is apparent that the present value of American railways cannot fall far short of \$22,000,000,000!

FEDERAL VALUATION OF AMERICAN RAILWAYS.

Whether this estimate will be confirmed by the physical valuation, which has been slowly getting under way since Congress authorized it three years ago, remains to be seen. It is proceeding so leisurely that the end is nowhere in sight and it now begins to look as if the estimate of \$50,000,000 for this useless piece of extravagance, of which the railways pay three-quarters, will have to be revised upwards.

While waiting for the completion of the Federal appraisal it may not be out of place to take note of other valuations that have disappointed the ideas of the over-capitalization critics of American railways. The most recent of these, under the charge of Dean Mortimer E. Cooley of the University of Michigan, was an appraisal of the Pere Marquette Railroad lines in Michigan. More than six months were given to the work. Ten parties of three men each were engaged three months on track inspection and six parties

of three men each four months on earth work. Equal care was bestowed on the collection of data on mechanical and marine equipment and in the land department work. There had been three previous appraisements of the Pere Marquette—one, in 1900, was to determine whether it was advisable to go from a specific to an *ad valorem* basis of taxation; the 1902 appraisal was to fix values as of a particular date for assessment under the *ad valorem* tax law of 1901, and the appraisal of 1905 was to test the values assessed by the state board of assessors. The results of these appraisals was as follows:

PERE MARQUETTE RAILROAD APPRAISALS OF DIFFERENT YEARS.
MICHIGAN PROPERTIES ONLY.

Year	Track Miles	Cost of Repro- duction new	Per Mile	Per cent. condi- tion	Cost of Repro- duction less Depreciation
1900.....	1,498.56	\$36,543,130	\$24,400	78.70	\$28,769,972
1902.....	1,732.69	43,520,470	25,100	79.96	34,798,978
1905.....	1,859.72	59,871,701*	27,354	83.85	42,403,309*
1914.....	1,883.75	79,851,210	42,390	80.58	64,349,449

*Does not include floating equipment, for which in 1902 the cost of reproduction was \$1,412,000, and this cost less depreciation, \$942,340.

The 1914 appraisal does not include the interest of the Pere Marquette in the Detroit Union Railroad Depot and Station and the Fort Street Union Depot Companies. But applying the per mile value of \$42,390 to the total 7,066 railway mileage of Michigan would give an aggregate value of \$299,516,740 for the state. The commercial valuation of the railways of Michigan by Prof. Henry C. Adams in 1904 was \$277,597,000.

SUMMARY OF STATE VALUATIONS.

No complete new state valuation of railways has been added to those given in former issues of these statistics. Progress has been reported in the pending appraisals in California and Kansas. As previously reported, the state valuations are as follows:

Steam Railroads of	Cost of Reproduction	Present Value	Capitalisation
Washington (1905).....	\$194,057,240	\$175,797,925	\$161,582,000
South Dakota (1908).....	106,494,503	91,605,132	109,444,600
Minnesota (1907).....	360,961,548	309,706,514	300,027,676
Wisconsin (1908).....	296,803,322	240,718,711	225,000,000
Nebraska (1911).....	327,190,820	279,169,253	*263,170,000
New Jersey (1911).....	374,760,425	285,016,934	*333,568,000
Total.....	\$1,660,267,858	\$1,382,013,569	\$1,392,792,276

*Commercial valuation in 1904, Census Bulletin 21.

Few individuals would care to sell their property at the price at which it is assessed for taxation. But the railways would be pleased to have the valuations in these states subjected to such a test. Their cost of reproduction value, as given above, with the taxes levied in the respective states, is given in the following statement:

State	Date of Valuation	Cost of Reproduction	Taxes Paid 1914	Per \$100 of Value	Tax Rate per \$100 Estimated Tax Value*
Minnesota.....	1907	\$360,961,548	\$5,396,777	\$1.49	\$ 0.61
Nebraska.....	1911	327,190,820	2,594,851	.79	.52
New Jersey.....	1911	374,760,425	6,604,781	1.76	.70
South Dakota.....	1908	106,494,503	1,061,203	.99	.70
Washington.....	1905	194,057,240	4,800,509	2.47	.98
Wisconsin.....	1909	296,803,322	4,387,545	1.47	.78
Total.....		\$1,660,267,858	\$24,845,666	\$1.49	.71

*U. S. Census, 1902.

It is clear from this statement that the railways of these states are paying taxes at a rate fully double that levied on other property in the states. In some the disproportion is greater than in others. But in not a single state are the railways not paying a higher rate than is levied on the private property they serve. At the arbitrary rate of \$1 per \$100, the value of the railways in these states would have to be placed at \$2,500,000,000 to justify the taxes they pay.

VI

OWNERSHIP OF AMERICAN RAILWAYS

According to the returns of this Bureau, there were 520,094 stockholders in the 448 companies operating 247,312 miles of line in the United States on the date of the last election of directors prior to June 30, 1915. This marked an increase of 63,865 over the number reported for practically the same roads, covering a mileage of 245,894 miles in 1914. As there are about 20,000 stockholders in the smaller operating roads, and the non-operating roads reported 82,846 stockholders to the Commission in 1914, it is evident that the ownership of American railways rests in the hands of approximately 623,000 stockholders. This is nearly double the total number of stockholders (327,785) reported to the Commission in 1904 for 1,182 roads.

The following statement gives the number of shareholders in twenty of the principal roads for the years 1912, 1914 and 1915, in comparison with the returns for the same companies to the Commission in 1904:

**GROWTH IN NUMBER OF STOCKHOLDERS IN TWENTY PRINCIPAL
AMERICAN RAILWAYS, 1904 TO 1915.**

Name of Company	Shareholders			
	1904	1912	1914	1915
Pennsylvania R. R.....	44,175	74,002	90,114	93,332
Atchison, Topeka & Santa Fe.....	17,823	31,738	39,825	42,738
New York Central & Hudson River.....	11,781	22,247	24,194	25,446
New York, New Haven & Hartford.....	10,842	21,948	26,675	26,589
Union Pacific.....	14,256	21,600	25,407	30,970
Great Northern.....	383	17,841	20,623	22,103
Southern Pacific.....	2,424	14,387	26,999	32,143
Northern Pacific.....	368	13,987	18,435	20,413
Chicago, Milwaukee & St. Paul.....	5,832	11,819	18,381	19,230
Baltimore & Ohio.....	7,132	11,414	15,191	36,568
Illinois Central.....	9,123	9,987	10,840	10,963
Erie.....	4,309	7,847	7,527	5,868
Chicago & North-Western.....	4,109	8,564	9,544	10,394
Boston & Maine.....	7,402	8,105	8,171	8,076
Norfolk & Western.....	2,911	5,323	7,291	8,815
Delaware & Hudson.....	3,819	6,483	6,813	7,137
Denver & Rio Grande.....	2,910	4,928	4,588	4,618
Missouri Pacific.....	1,861	4,382	5,577	6,972
Chesapeake & Ohio.....	1,478	4,138	6,216	6,604
Louisville & Nashville.....	1,672	3,318	4,546	4,703
Total.....	154,610	304,058	376,957	423,682
Increase since 1904, per cent.....				174.0%

From this it appears that the number of stockholders in these companies has increased 174% in eleven years and is now nearly 100,000 greater than the total for all companies in 1904. The average amount of stock per stockholder in the roads reporting to this Bureau was \$13,992, or nearly 140 shares to each. Where the average stockholder's income does not average \$600 per annum, the wages of the average employe exceeds \$800.

There are no figures showing the distribution of railway bonds, but it is probably greater than that of stocks, while the indirect interest in railway bonds is almost universal by reason of their being so largely held by trustees, including banks, savings banks, life and fire insurance companies, and educational and benevolent institutions. It has been computed that these various institutions hold in the neighborhood of \$2,000,000,000.

In 1913 the Comptroller of the Currency reported that railway bonds and stocks were held as assets by the following banking organizations:

	Railway Bonds and Stocks as Assets
Savings Banks.....	\$ 821,553,244
State Banks.....	65,501,889
Private Banks.....	601,573
Loan and trust companies.....	297,324,766
Total.....	\$1,684,979,972

This distribution of assets was discontinued in 1914, railway securities being included in resources under the general item of "Bonds, Securities, etc." as in the reports for National banks.

Today the value of the vast body of railway securities rests in the last analysis on just reasonable and intelligent federal regulation, which in the end must supersede all state regulation.

In the following statement the whole field of railway service is summarized for 1915 in comparison with that of 1914 and 1907. The official figures for 1914 are included in this table in the adjoining column to those of the Bureau for that year, corresponding as they do each other, although compiled independently.

VII

PUBLIC SERVICE OF THE RAILWAYS

32,327,466,000 passengers carried one mile at.....2.023 cents per mile
277,232,653,000 tons of freight carried one mile at.....7.380 mills per mile

Having passed in review the physical, mechanical, financial and human provisions made by the railways to provide transportation service for a people of over 100,000,000 inhabiting an area of almost 3,000,000 square miles, it remains in this chapter to set forth what has been accomplished by the great transportation agency represented in 247,312 miles of line, 379,344 miles of track; 65,251 locomotives, 54,378 passenger cars, 2,362,914 freight cars, with terminal facilities to match, costing \$19,000,000,000 and operated by 1,567,700 employees.

The net achievement is all set forth in the two lines at the opening of this chapter. To be sure, millions of tons of mail matter have been carried at less than cost, and other millions of express parcels have been transported at remunerative rates, but these and all other incidental services represent less than 8% of the total service performed by the railways for the American public at unreasonably low rates.

The year under review presents no new records either in traffic carried or in the rates received therefor. The volume of business was less, except in the parcel post swollen mail, than for the two preceding years and the revenues too were less than in 1914 and 1913, in spite of a slight increase in average passenger and freight receipts.

In the following statement the whole field of railway service is summarized for 1915 in comparison with that of 1914, 1912 and 1907. The official figures for 1914 are included in this table in the adjoining column to those of the Bureau for that year, corroborating as they do each other, although compiled independently:

COMPARATIVE SUMMARY OF PASSENGER AND FREIGHT SERVICE FOR
THE YEARS ENDING JUNE 30, 1915, 1914, 1912 AND 1907.

Item (m=000 omitted)	1915 Bureau Figures	1914 Bureau Figures	1914* Official Figures	1912† Official Figures	1907 Official Figures
Miles Represented.....	247,312	245,894	245,624	246,829	227,454
PASSENGER SERVICE					
Passengers carried (m).....	961,351	1,032,086	1,053,139	1,004,081	873,905
Passengers carried 1 mile (m).....	32,327,466	35,129,269	35,258,498	33,132,355	27,718,554
Passengers carried 1 mile per mile of line.....	130,715	142,860	144,278	136,699	123,259
Mileage of revenue passenger trains (m).....	572,103	594,510	602,388	585,853	509,328
Average number of passengers in train.....	56.5	59.2	56	53	51
Average journey per passenger, miles.....	33.6	34.0	33.61	33.18	31.72
Passenger car miles (m).....	3,203,881	3,369,781	3,399,293	3,235,634	.....
Average passengers per car.....	10.09	10.42	10.89	10.24	.....
FREIGHT SERVICE					
Number of tons reported carried (m)	1,779,512	1,934,873	1,976,138	1,844,978	1,796,337
Tons carried 1 mile (m).....	277,232,653	288,746,432	288,319,890	264,080,745	236,601,390
Tons carried 1 mile per mile of line.	1,120,983	1,174,243	1,176,923	1,078,580	1,052,119
Mileage of revenue freight trains (m)	548,363	599,981	605,923	612,345	629,996
Average number of tons in trains...	505	481	452	407	357
Typical haul of average railway, miles.....	156	149	146	143	132
Mileage of revenue mixed trains (m)	35,022	33,781	32,565	37,128	32,111
Total revenue train mileage (m)....	1,155,489	1,228,273	1,242,080	1,236,759	1,171,923
Total mileage freight cars (m).....	19,935,455	20,830,297	20,796,895	19,466,402	17,122,260
Average freight car miles per day...	.....	.....	.....	25.4	22.7
Average tons per car (loaded and empty).....	13.55	13.86	13.86	13.56	13.82
Total locomotive miles (m).....	1,562,839	1,651,247	1,689,748	1,666,352	.....

†Exclude returns from switching and terminal companies, included in 1915, 1914 and 1907.

*Class I and II only.

From this table it will be perceived that the volume of passenger traffic was below that of 1912, but thanks to the length of the haul the freight ton mileage was greater. In connection with the passenger service, it appears that there was a falling off in the number of passengers per train and also in the average passenger journey. It is worthy of remark that since 1895 the average length of the passenger journey has increased from 24 to 33.6 miles. This is generally attributed to trolley competition, especially in New England and all Eastern states.

On the freight side of this summary, the traffic shows a recession from the high record of 301 billion tons one mile in 1913 to 277 billion in 1915. The average number of tons in trains in the Bureau

columns exceed official figures because the divisor is exclusive of the mixed train mileage which is all included in the official computation. Were this included in Bureau computations, the results for 1914 and 1915 would have been an average of 455.6 and 475.2 tons to a train, respectively, for those years. As the term "mixed train mileage" includes passenger mileage, and the revenue ton mileage includes freight carried in mixed trains, neither computation is strictly accurate. The truth lies between them.

PASSENGER TRAFFIC 1915-1888.

That the student may follow the course of the passenger traffic of American railways in its various details since the organization of Official Statistics, the next statement gives the more significant traffic and operating units by groups for 1915, with totals 1888 to 1915. In this table the arbitrary practice adopted by the Commission of adding the total of mixed train mileage to both passenger and freight mileage, respectively, is followed to arrive at comparable units:

SUMMARY OF PASSENGERS CARRIED, PASSENGER MILEAGE, MILEAGE OF PASSENGER TRAINS, AVERAGE PASSENGERS IN TRAINS, PASSENGER REVENUES AND AVERAGE RECEIPTS PER PASSENGER MILE, 1915 TO 1888:

Territory	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (Millions)	Average Receipts per Passenger Mile (Cents)
Group I.....	136	2,630	34	77	19.4	\$ 49	1.886
" II.....	336	8,056	122	66	24.0	157	1.945
" III.....	95	3,843	77	50	40.7	76	1.972
" IV.....	39	1,453	34	43	37.5	31	2.158
" V.....	75	2,635	65	41	35.2	57	2.151
" VI.....	132	5,753	114	51	43.5	111	1.932
" VII.....	15	1,285	24	53	83.4	26	2.004
" VIII.....	54	3,003	63	48	56.0	63	2.094
" IX.....	19	1,020	25	40	52.3	25	2.435
" X.....	60	2,649	49	54	44.1	59	2.235
United States							
1915 Bureau.....	961	32,327	607	53	33.6	654	2.023
1914* Official....	1,053	35,258	602	56	33.6	700	1.982
1913* ".....	1,034	34,576	593	55	33.6	696	2.008
1912* ".....	1,004	33,132	586	53	33.2	660	1.987
1911* ".....	997	33,202	573	55	33.5	658	1.974
1910* ".....	972	32,338	549	56	34	629	1.938
1909* ".....	891	29,109	506	54	33	564	1.928
1908* ".....	890	29,083	506	54	33	567	1.937
1907 ".....	874	27,719	509	51	32	565	2.014
1906 ".....	798	25,167	479	49	31	510	2.003
1905 ".....	739	23,800	460	48	32	473	1.962
1904 ".....	715	21,923	440	46	31	444	2.006
1903 ".....	695	20,916	425	46	30	422	2.006
1902 ".....	650	19,690	406	45	30	393	1.986
1901 ".....	607	17,354	385	42	29	351	2.013
1900 ".....	577	16,038	363	41	28	324	2.003
1899 ".....	523	14,591	354	41	28	291	1.978
1898 ".....	501	13,380	342	39	27	267	1.973
1897 ".....	489	12,257	335	37	25	251	2.022
1896 ".....	512	13,049	333	39	26	267	2.019
1895 ".....	507	12,188	318	38	24	252	2.040
1894 ".....	541	14,289	327	44	26	285	1.986
1893 ".....	594	14,229	336	42	24	301	2.108
1892 ".....	560	13,363	318	42	24	287	2.126
1891 ".....	531	12,844	308	42	24	281	2.142
1890 ".....	492	11,848	286	41	24	261	2.167
1889 ".....	472	11,554	277	42	24	254	2.165
1888 ".....	412	10,101	252	40	24	237	2.349
Increase 1888 to 1915.....	133%	220%	141%	33%	40%	176%	.....
Decrease.....							13.9%

*Exclusive of switching and terminal companies.

*Class I and II roads only.

†Includes 25% of mixed train mileage, that being practice prior to 1900.

Interest in this table naturally focuses on the last column. Herein is told how for twenty years the average receipts per passenger per mile have fluctuated slightly below two cents. The rise in the average in 1915 is wholly due to the advance in passenger rates granted to eastern roads, as is evidenced by the following comparison of the averages by groups for 1915 and 1914:

	Passenger Receipts per Mile		Increase 1915 Cents	Decrease 1915 Cents
	1915 Cents	1914 Cents		
Group I.....	1.886	1.789	.097	....
" II.....	1.945	1.728	.217	....
" III.....	1.972	1.902	.070	....
" IV.....	2.158	2.160	....	.002
" V.....	2.151	2.189	....	.038
" VI.....	1.932	1.939	....	.007
" VII.....	2.004	2.208	....	.204
" VIII.....	2.094	2.124	....	.030
" IX.....	2.435	2.435	....	....
" X.....	2.235	2.320	....	.085
United States.....	2.023	1.981	.042	....

In analyzing this statement, the student should bear in mind that the increase granted to eastern roads by the Commission went into effect during the year 1915, while that to western roads dates only from January, 1916. He should also distribute the increases in the averages of Groups II and III more evenly than they appear in the table, because of the consolidation of the New York Central Lines into Group II, where formerly the Lake Shore and Michigan Southern, with its large passenger mileage, reported in Group III.

In studying the figures of average receipts per passenger mile, it is also well to remember that more than twenty years ago Professor Adams, as official statistician, during six consecutive years made the following apportionment of the average cost of carrying a passenger one mile:

	1888 Cents	1889 Cents	1890 Cents	1891 Cents	1892 Cents	1893 Cents
Cost of carrying a passenger 1 mile	2.042	1.993	1.917	1.910	1.939	1.955

Observe that these figures approximate the average receipts from passenger traffic today, notwithstanding the notorious fact that the cost of everything entering into the safety, comfort, convenience and punctuality of the passenger service, whether in wages, material or facilities, has in the meantime advanced from 25% to 50% over the cost in 1893, when the formula was dropped because its showing was too favorable to the railways.

RECEIPTS FROM MAIL AND EXPRESS

On March 28, 1916, President Wilson, in a letter to Congressman Kitchin, the majority leader of the House of Representatives, wrote: "The railways of the country are becoming more and more the key to its successful industry, and it seems to me of capital importance that we should lay a new ground work of actual facts for the necessary future regulation. I know that we all want to be absolutely fair to the railroads and it seems to me that the proposed investigation is the first step toward the fulfillment of that desire."

Without waiting for the results of such investigation, and in the face of a ground work of facts gathered by successive Congressional inquiries, the House attached the Moon rider to the general post office appropriation bill designed to further mulct the railways by substituting the space method for weighing as the measure of railway mail pay. It is not proposed here to discuss the merits of the two methods. The railways of the country, who have to provide the service, have unanimously protested against the change. It is already condemned by its sponsor, who, in the face of Congressional findings that the railways are underpaid by the present weighing method, assures Congress that the space method will save the government a sum approximating \$8,000,000 annually. In other words, where the railways are already losing from \$15,000,000 to \$30,000,000 a year through the government's abuse of one method, the House of Representatives has voted that they shall lose \$8,000,000 more by the substitution of another pack of cards, and a stacked pack at that.

So far as the railways are concerned, they have been forced by the parcel post regulations to carry what is essentially freight business on passenger trains, with all that implies of passenger service, speed, equipment and station facilities. This is not the place to more than suggest that the entire legitimate mail service of the United States is being blocked and retarded by a service that does not pay its way either to the government or the railways. Such is the fact.

Nor is it necessary to go into the details of how the post office authorities mulct the railways by this present method of weighing the mails every four years and letting the railways carry all the increased weight the following four years without pay. At every turn the government fixes the rate of pay and the railways carry the mail freight below cost of the service.

Here it is only proper to present the government's own figures to establish the case against the Post Office Department. This is done in the following summary in which payments to the railways for carrying the mails are compared with the gross revenues of the Post Office Department and the compensation of railway mail clerks during the period of railway regulation, 1888 to 1915:

SUMMARY COMPARING RAILWAY MAIL PAY WITH COMPENSATION OF RAILWAY MAIL CLERKS AND POSTAL REVENUES, 1888 TO 1915.

Year	Railway Mail Revenues	Pay of Railway Mail Clerks Official	Postal Revenues Official
1888 Official	\$18,752,234	\$ 4,981,366	\$ 52,695,176
1894 "	30,059,657	6,989,449	75,080,479
1899 "	35,999,011	8,610,732	95,021,384
1904 "	44,499,732	12,095,437	143,582,624
1905 "	45,426,125	13,304,994	152,826,585
1906 "	47,371,453	14,222,201	167,932,783
1907 "	50,378,964	15,248,601	183,585,006
1908 "	48,517,563	17,479,504	191,478,663
1909 "	49,380,783	18,380,725	203,562,383
1910 "	48,913,888	19,420,349	224,128,657
1911 "	50,702,625	20,152,904	237,879,823
1912 Bureau	50,458,769	20,876,963	246,744,015
1913 "	50,053,481	22,815,795	266,619,525
1914 "	54,892,500	26,107,051	287,934,565
1915 "	57,973,106	28,530,621	287,248,166
Increase, 27 years, 1888 to 1915	209.2%	472.8%	445.1%
Increase, 10 years, 1905 to 1915	27.6%	114.4%	87.9%

Here we have absolute demonstration of the vast extension of mail facilities and always at the expense of the railways. In January, 1901, what is known as the Wolcott-Loud Commission, created by Act of Congress in June, 1898, after an exhaustive inquiry, reported that the prices paid for mail transportation and postal car service "were not excessive"; and yet here we see that the revenues of the railways during the past ten years have only increased 27.6%,

where the postal revenues have increased 87.9% and the pay of railway mail clerks increased 114.4%. Had railway mail pay increased relatively to postal revenues during the past decade, the railways in 1915 would have received \$85,355,000 instead of \$57,973,106, and had they increased during the same period as rapidly as the pay of the railway mail clerks who handle the railway mail, the mail revenues of the railways would have been \$97,393,344, or \$39,420,238 more than they were. Moreover, between 1900 and 1905 postal revenues increased 55% where railway mail revenues had increased only 21%.

Beyond peradventure, if the railway mail pay was not excessive in 1901, it is \$40,000,000 short of being commensurate to the service performed now. The extent, but not the quality or cost of that service may be measured by the revenues of the government which are derived from a per ounce or per pound basis. The quality of the mail service is measured by the increase in the cost of everything employed in rendering it. In 1900 the mails were carried on 179,982 miles of railroad, with a net capital of \$51,000 per mile; in 1915 they were carried on 233,000 miles of railroad with a net capital of about \$65,000. Here is an increase of 30% in mileage and 27% in cost per mile, making combined an increase of 66% in the mere physical facilities placed at the disposal of the government. In the meantime the railway mail revenues increased only 53%.

There is another simple way of demonstrating the failure of the postal department to treat the railways fairly. In 1900, when their pay was officially pronounced to be "not excessive," it amounted to 2.54% of railway revenues, and presumably cost the railways that proportion of their operating expenses. Between 1900 and 1915 no one doubts that the mail service has kept pace with railway revenues, the postal department's revenues having increased 181% where railway revenues have increased less than 100%. If the proportion, 2.54%, of railway mail pay to railway revenues in 1900 be applied to the railway revenues in 1915, it would have yielded nearly \$75,000,000.

But the service imposed on the railways in 1915 is very much more onerous and expensive in proportion than that required in 1900, and the pay should be increased proportionately. Where postal cars built according to imperative government specifications cost from \$6,000 to \$8,000 fifteen years ago, they are now all steel,

costing from \$11,000 to \$12,000, and such increase in cost is characteristic of everything required by the Post Office Department of the railways.

RAILWAY RECEIPTS FROM EXPRESS.

All and more than all of the increase in railway receipts from mail in the year 1915 was lost in the decline in their receipts from express. Where under normal conditions their receipts from express should show an increase of from \$3,000,000 to \$5,000,000 annually, there was a drop of over \$3,000,000 in 1914 followed by another drop of over \$5,500,000 in 1915. The course of receipts from this source in comparison with those from mail for a period of ten years is shown in the following statement:

SUMMARY OF RAILWAY RECEIPTS FROM MAIL AND EXPRESS, YEARS ENDING JUNE 30, 1894 TO 1915.

Year	Mail		Express	
	Revenues	Percentage of Earnings	Revenues	Percentage of Earnings
1894 Official.....	\$30,059,667	2.80	\$23,035,300	2.15
1899 ".....	35,909,011	2.74	26,756,064	2.04
1900 ".....	37,752,474	2.54	28,416,150	1.91
1901 ".....	38,453,602	2.42	31,121,613	1.96
1902 ".....	39,835,844	2.31	34,253,450	1.96
1903 ".....	41,709,396	2.19	38,331,964	2.02
1904 ".....	44,499,732	2.25	41,875,636	2.12
1905 ".....	45,426,125	2.18	45,149,155	2.17
1906 ".....	47,371,483	2.04	51,010,930	2.19
1907 ".....	50,378,964	1.94	57,333,931	2.21
1908 ".....	48,517,563	2.03	58,692,091	2.45
1909*.....	49,380,783	2.04	59,647,022	2.47
1910*.....	48,913,888	1.78	67,190,922	2.44
1911*.....	50,702,625	1.82	70,725,137	2.54
1912 Bureau figures.....	50,458,769	1.80	73,043,799	2.80
1913 ".....	50,063,481	1.60	78,536,196	2.52
1914 ".....	54,892,500	1.80	75,320,532	2.47
1915 ".....	57,973,106	1.97	69,784,468	2.37
Increase per cent, 11 years.....	30.3%	.....	62.2%	.....

*Excludes switching and terminal companies.

The figures for 1913, 1914 and 1915 in this table afford a striking illustration of how the railways get the worst of it "going and coming," as the saying is, in the transference of express business that pays its freight to the parcel post which does not. Between 1913 and 1915 the railway mail pay increased \$7,919,625 and the railway express revenues decreased \$8,741,728—a net decrease of

\$822,103, where between the two sources of revenue there would have been a normal increase of at least \$10,000,000.

INCOME ACCOUNT OF EXPRESS COMPANIES.

The next summary gives the income account of the express companies, as reported to the Commission for the years 1915 and 1914:

STATEMENT OF REVENUES AND EXPENSES OF THE PRINCIPAL EXPRESS COMPANIES FOR THE YEAR ENDING JUNE 30, 1915 AND 1914, FROM THE MONTHLY REPORTS.

No.	Item	Grand Total (12 companies)	
		1915	1914
1	Gross receipts from operation.....	\$144,826,743	\$158,891,325
2	Express privileges (to railways, etc.).....	73,507,585	79,906,078
3	Operating revenues.....	71,319,178	78,985,248
4	Operating expenses.....	71,493,566	77,221,995
3	Net operating revenues.....	*174,388	1,763,254
4	Net deficit outside operation.....		33,887
5	Total net revenue.....		1,729,367
7	Taxes accrued.....	1,379,894	1,491,698
8	Operating income.....	*1,554,282	237,669
9	Non-transportation revenue.....	4,131,068	4,501,778
10	Gross income.....	†2,576,786	4,739,446
11	Deductions, including interest.....	1,281,748	1,239,724
12	Net corporate income.....		3,499,719
13	Dividends.....		2,986,250
14	Appropriation for reserve.....		
15	Balance to Profit and Loss.....	\$1,295,038	513,469
16	Dividends from surplus.....		2,577,683
17	Profit and Loss account credit to balance sheet after deductions for year.....		\$27,632,630
18	Miles covered.....	296,708	305,890

*Deficit.

†Includes \$21,308 uncollectible revenues.

As apparent in the table, the details furnished for 1914 are missing for 1915, but from what is given it is evident that the net balance is insufficient to meet the dividends appropriated from income (\$2,228,065) except as that income is swelled by "other income" from dividends and interest on funded and unfunded securities, amounting in all to \$3,211,594 in 1915. In 1913 the transportation revenue

of the express companies was \$164,862,623, or \$20,000,000 more than in 1915. This alone caused a loss of about \$10,000,000 to the railways.

THE FREIGHT TRAFFIC.

While the passenger traffic from its nature, and the mail revenues from the injustice associated with their arbitrary curtailment by the government attract more public attention, it is the freight traffic that pays the major part of the "freight." As has been truthfully said:

"The social welfare is more dependent upon cheap and unfettered transportation of commodities than upon inexpensive and speedy means of travel."

In a period of advancing prices for almost everything contributing to the "social welfare," there has been no advance in the cost of this commodity so necessary to the comfort and prosperity of the American people, as the next summary shows:

SUMMARY OF FREIGHT MILEAGE, REVENUE, AND RECEIPTS PER TON MILE, 1901 TO 1915.

Year	Number of Tons Carried One Mile	Increase over Preceding Year (Per Cent)	Freight Revenue	Increase over Preceding Year (Per Cent)	Receipts per Ton-Mile (Mills)
1901 Official.....	147,077,136,040		\$1,118,543,014		7.50
1902 ".....	157,289,370,053	6.9	1,207,228,845	7.9	7.57
1903 ".....	173,221,278,993	10.2	1,338,020,026	10.8	7.63
1904 ".....	174,522,089,877	0.7	1,379,002,893	3.0	7.80
1905 ".....	186,463,109,510	6.9	1,450,772,838	5.2	7.66
1906 ".....	215,877,551,241	15.7	1,640,386,655	13.1	7.48
1907 ".....	236,601,390,103	9.6	1,823,651,998	11.2	7.59
1908* ".....	218,381,554,802	D 7.7	1,655,419,108	D 9.2	7.54
1909* ".....	218,802,986,929	0.2	1,677,614,678	1.3	7.63
1910* ".....	255,016,910,451	16.6	1,925,553,036	14.8	7.53
1911* ".....	253,783,701,839	D 0.4	1,925,950,887	.0	7.57
1912* ".....	264,080,745,058	4.0	1,968,598,630	1.6	7.44
1913** ".....	301,398,782,108	14.0	2,198,930,565	12.3	7.29(a)
1914** ".....	288,319,890,210	D 4.3	2,114,697,629	D 3.9	7.33(a)
1915 Bureau.....	277,232,653,000	D 3.8	2,046,047,412	D 3.2	7.39
Fourteen years' increase.....		88.4		82.9	101.2

*Excludes figures of switching and terminal companies.

**Class I and II only.

(a) The Bureau's figure in 1913 was 7.27 mills; in 1914, 7.23 mills.

D Decrease.

The American who can study the message of these figures without a sentiment of just pride in what the railways of the United States have done for the "social welfare" of his country lacks perception of the underlying forces that make for his country's greatness and prosperity. It shows that during a period when wages, rents, taxes and the price of everything entering into the cost of living were mounting skyward the freight cost never to the fraction of a cent was added to to interfere with the movement of the necessities or luxuries of life. The freight rate was low in 1901; it was lower in 1915. That is the tale told by the preceding table.

FREIGHT TRAFFIC BY GROUPS AND SINCE 1888.

The same tale for a longer period is told in the succeeding summary, which also presents a comprehensive review of the freight traffic in 1915 by the original territorial groups:

**SUMMARY OF FREIGHT TRAFFIC SHOWING ESSENTIAL ASSIGNMENTS
BY GROUPS IN 1915 AND YEARLY SINCE 1888.**

Territorial Division	Tons Carried (Millions)	Tons Carried One Mile (Millions)	Mileage Freight Trains (Millions)	Average Tons in Train	Average Haul per Ton (Miles)	Freight Revenue (Millions)	Receipts per Ton-Mile (Cents)
Group I....	69	6,495	21	323	94	\$ 76	1.176
" II...	523	71,179	113	628	136	497	.693
" III..	388	50,197	88	567	132	298	.564
" IV..	117	24,739	40	623	211	129	.521
" V...	134	23,811	70	337	177	185	.776
" VI...	272	47,199	114	415	173	351	.744
" VII..	35	9,728	20	480	277	88	.905
" VIII..	108	21,572	60	260	200	204	.944
" IX...	57	8,062	27	294	141	79	.983
" X...	76	14,250	30	482	187	144	1.010
United States							
1915 Bureau	1,779	277,232	583	475	156	2,046	.738
1914 Official	(a) (b) 1,976	288,320	606	452	146	2,115	.733
1913(a)(b) "	2,058	301,399	644	445	147	2,199	.729
1912(a) " "	1,845	264,081	612	407	143	1,969	.744
1911(a) " "	1,782	253,784	626	383	143	1,926	.757
1910(a) " "	1,850	255,017	635	380	138	1,926	.753
1909(a) " "	1,557	218,303	569	363	142	1,678	.763
1908(a) " "	1,533	218,382	587	352	144	1,655	.754
1907 " "	1,796	236,601	630	357	132	1,824	.759
1906 " "	1,631	215,878	594	344	132	1,640	.748
1905 " "	1,428	186,463	546	322	131	1,451	.766
1904 " "	1,310	174,522	535	308	133	1,379	.780
1903 " "	1,304	173,221	526	311	133	1,338	.763
1902 " "	1,200	157,289	500	296	131	1,207	.757
1901 " "	1,089	147,077	492	281	135	1,119	.750
1900 " "	1,082	141,597	493	271	131	1,049	.729
1899 " "	944	123,667	(c) 508	244	131	914	.724
1898 " "	864	114,078	504	226	132	877	.753
1897 " "	729	95,139	465	205	130	773	.798
1896 " "	754	95,328	479	199	126	787	.806
1895 " "	687	85,228	449	190	124	730	.839
1894 " "	638	80,335	447	180	126	699	.860
1893 " "	745	93,588	509	184	126	829	.878
1892 " "	707	88,241	485	182	125	799	.898
1891 " "	676	81,074	446	182	120	737	.895
1890 " "	637	76,207	435	175	120	715	.941
1889 " "	539	68,727	383	179	127	642	.922
1888 " "	480	61,329	348	176	128	611	1.001
Increase, 1888 to 1915	271%	352%	68%	170%	22%	234%	D26.3%

(a) Excludes figures of switching and terminal companies.

(b) Classes I and II only.

(c) Includes 75% of mixed train mileage, that being the practice prior to 1900.

D = Decrease.

The table by groups shows substantial advances in average receipts per ton mile over the 1914 averages in groups I, II and III, as the result presumably of the decision in the Eastern rate case. The averages for groups IV, V, VI and IX were lower, and that for VII showed it was practically unchanged. Groups VIII and X had slightly higher averages for 1915. The figures indicate that the Eastern roads profited to the amount of approximately \$35,000,000 by the Eastern rate decision.

The advance of 5-1000ths of a cent per ton mile for 1915 over 1914 on the tonnage carried one mile accounted for nearly \$14,000,000 of the total receipts from freight.

TON MILE RATES IN FOREIGN COUNTRIES.

The following table gives the average receipts per ton mile for the countries named, so far as the same is ascertainable from the latest official reports:

	Receipts per Ton-Mile Cents		Receipts per Ton-Mile Cents
United Kingdom (1913).....	2.23	Denmark (1914).....	2.33
Germany (1913).....	1.37	Holland (1914).....	1.36
France (1911).....	1.30	Belgium (1912).....	1.13
Russia (1910).....	.94	Switzerland (1913).....	2.90
Austria (1912).....	1.50	Spain (1909).....	2.46
Hungary (1912).....	1.34	New South Wales* (1915).....	1.90
Bulgaria (1913).....	1.94	South Australia (1915).....	2.12
Sweden (1912).....	1.52	Japan (1914).....	.87
Norway (1914).....	1.86	Canada (1915).....	.75

*Omits terminal receipts, 23.39 cents per ton, 1915.

The material changes in these averages, compared with those given in 1914, are advances from 1.53 cents per ton mile to 1.94 cents in Bulgaria; from 1.64 cents to 1.86 cents in Norway; from 1.74 to 1.90 in New South Wales, and 1.84 to 2.12 cents in South Australia. After declining from .758 cent in 1913 to .742 cent in 1914, the average receipts per ton mile on Canadian railways advanced to .751 cent in 1915. This, it will be perceived, is still substantially higher than the .738 of American railways for that year. It is significant, however, of the close relations and similarity in conditions of American and Canadian railways that their rates are the only ones that yield anything like the same average receipts, which are far below those of other countries in the table.

For other information regarding foreign roads, the reader is referred to the tables at the end of this pamphlet.

FREIGHT RECEIPTS ON GERMAN ROADS 1886-1913.

Where the average freight receipts in the United States, under regulated private ownership, have declined from .895 cent in 1891 to .738 in 1915, or over 17%, they have only been reduced from 1.49 cents to 1.37 cent, or 8%, on the state operated roads of Germany, as appears from the next statement:

RECEIPTS PER TON AND TON MILE ON GERMAN RAILWAYS SINCE 1886.

Year	Per Ton	Per Ton-Mile Cents	Year	Per Ton	Per Ton-Mile Cents
1913.....	\$0.85	1.37	1903.....	\$0.88	1.42
1912.....	.85	1.37	1902.....	.88	1.43
1911.....	.86	1.39	1901.....	.89	1.43
1910.....	.85	1.41	1900.....	.90	1.42
1909.....	.86	1.41	1899.....	.90	1.43
1908.....	.87	1.41	1898.....	.91	1.45
1907.....	.86	1.40	1896.....	.95	1.51
1906.....	.87	1.41	1891.....	.95	1.49
1905.....	.87	1.42	1886.....	1.05	1.56
1904.....	.89	1.42			

The average daily compensation of an American railway employe will pay for carrying a ton of freight approximately 366 miles, where that of a German railway employe will pay for carrying it approximately 94 miles. The difference is almost 4 to 1 in favor of the American wage earner.

PROPORTION OF COMMODITIES MOVED.

The next summary gives the relative tonnage of the various classes of freight moved, and affords a side light on the shifting elements that affect the average freight receipts:

SUMMARY OF TONNAGE AND PROPORTION OF DIFFERENT CLASSES OF COMMODITIES MOVED, 1911 AND 1915.

Class of Commodity	1911 Official		1914 Official Class I and II		1915 Bureau	
	Tonnage Reported as Originating on Line	Per Cent of Aggre- gate	Tonnage Reported as Originating on Line	Per Cent of Aggre- gate	Tonnage Reported as Originating on Line	Per Cent of Aggre- gate
Products of Agriculture.....	85,566,053	8.85	102,199,907	9.34	113,013,673	11.44
" Animals.....	23,763,262	2.46	27,138,634	2.48	26,933,875	2.72
" Mines.....	539,255,980	55.75	626,075,666	57.22	544,401,970	55.08
" Forests.....	108,506,272	11.22	110,877,781	10.13	92,039,909	9.31
Manufactures.....	135,175,536	13.97	149,183,281	13.64	135,844,849	13.74
Merchandise.....	36,519,321	3.77	41,474,238	3.79	31,306,510	3.17
Miscellaneous.....	38,447,567	3.98	37,174,388	3.40	44,879,223	4.54
Total.....	967,233,991	100.00	1,094,123,895	100.00	988,420,009	100.00

Since 1901 annual statements like the above afford the percentages for the succeeding summary, showing how the proportion of commodities carried fluctuates yearly and yet preserves the same general relation to the whole:

SUMMARY SHOWING PERCENTAGE OF FREIGHT TRAFFIC MOVEMENT BY CLASSES OF COMMODITIES, 1901 TO 1915.

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Pro- ducts of Agri- culture	Anim- als	Mines	Forest	Total	Manu- factures	Mer- chan- dise	Miscel- laneous	Total
1901 Official.....	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902 ".....	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903 ".....	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904 ".....	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.58
1905 ".....	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906 ".....	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79
1907 ".....	8.62	2.29	53.39	11.38	75.68	15.41	3.89	5.02	24.32
1908 ".....	8.74	2.46	55.72	11.35	78.27	13.15	4.04	4.54	21.73
1909 ".....	8.92	2.49	55.60	11.75	78.76	13.15	4.11	3.98	21.24
1910 ".....	8.13	2.10	56.23	11.67	78.13	14.42	3.69	3.76	21.87
1911 ".....	8.85	2.46	55.75	11.22	78.28	13.97	3.77	3.98	21.72
1912 ".....	9.09	2.50	56.75	10.03	78.37	14.02	3.84	3.77	21.63
1913* ".....	9.27	2.31	56.86	9.79	78.23	14.46	3.71	3.60	21.77
1914* ".....	9.34	2.48	57.22	10.13	79.17	13.64	3.79	3.40	20.83
1915 Bureau.....	11.44	2.72	55.08	9.31	78.55	13.74	3.17	4.54	21.45

*Class I and II roads only.

The changes evident in a comparison of the percentages for 1915 and 1914 are sufficient in themselves to account for slightly higher receipts per ton mile, even though no advance in freight rates had been allowed by the Commission. The rule that the average receipts advance as the proportion of high rate freight increases is by no means an invariable one. It is affected by length of haul, etc., and by the change in the proportions within the division into low and high rate commodities.

TRAFFIC AND RECEIPTS FROM SELECTED COMMODITIES.

The next summary shows the quantities, ton mileage, revenues and average receipts per ton mile of certain commodities for which the Commission requires special information:

SUMMARY OF SELECTED COMMODITIES FOR THE YEAR ENDING JUNE 30, 1914; 151,822 MILES REPRESENTED.

Commodity	Freight Carried in Carload Lots	Ton-Mileage of Freight Carried in Carload Lots	Revenue from Freight Carried in Carload Lots	1914 Average Receipts per Ton per Mile from Same (Cents)	1910 Average Receipts per Ton per Mile from Same (Cents)
Grain.....	41,349,549	9,359,558,932	\$ 59,857,890	.639	.630
Hay.....	7,337,933	1,169,024,840	11,882,958	1.016	1.019
Cotton.....	5,928,487	1,192,773,069	21,190,208	1.777	1.823
Live Stock.....	12,310,783	2,612,173,198	32,998,057	1.263	1.217
Dressed Meats.....	2,671,087	893,583,208	8,688,419	.972	.904
Anthracite Coal.....	32,333,087	5,433,445,254	32,690,614	.602	.589
Bituminous Coal.....	280,148,050	37,278,890,241	170,356,401	.457	.495
Lumber.....	84,676,144	14,844,544,078	103,574,192	.698	.734

There was an increase in 1914 over 1913 in the average receipts per ton mile for all the named commodities except lumber, but compared with 1910, the averages for 1914 were still below those for 1910 on hay, cotton, bituminous coal and lumber.

The average haul for the respective commodities was grain, 226 miles; hay, 159; cotton, 201; live stock, 212; dressed meats, 334; anthracite coal, 168; bituminous coal, 133; and lumber, 175. In every instance, except live stock and dressed meats, the haul averaged slightly shorter in 1914 than in 1913.

RATES IN NEW SOUTH WALES.

The statistics of the government owned and operated railways of New South Wales afford many points for comparison with our own. From them the following summary, giving the haul and average rates for certain commodities, has been abstracted :

STATEMENT OF AVERAGE HAUL AND TON MILE RECEIPTS ON THE RAILWAYS OF NEW SOUTH WALES FOR YEARS ENDING JUNE 30, 1914, AND 1915.

Commodity	1914		1915	
	Average Haul (Miles)	Receipts per Ton Mile (Cents)	Average Haul (Miles)	Receipts per Ton Mile (Cents)
Coal, Coke and Shale.....	26.39	.98	25.05	1.08
Firewood.....	30.59	1.48	34.55	1.46
Grain and Flour.....	252.57	.76	232.77	.74
Hay, Straw and Chaff.....	206.03	.76	220.68	.72
Wool.....	304.13	3.86	296.23	3.92
Live Stock.....	251.16	2.20	256.64	2.12
General Merchandise (including all other Goods).....	96.69	2.82	89.68	2.78
Total.....	80.45	1.74	78.64	1.90

To these average receipts one-third should be added to cover the terminal charges, which are not included in these Australian figures but are included in the 7.38 mills average of American railways. Even excluding the terminal charges, the New South Wales average is not far from three times as high as the American average.

Note should be made of the advance in the average for 1915. This is the government's method of providing for an increase in wages and cost of materials. As a dealer in the commodity known as transportation, this is the combination of business sense and prerogative.

VIII

EARNINGS AND EXPENSES

In presenting the first summary under this title, the Bureau follows the correct theory enunciated but not practiced by Prof. Henry C. Adams, when Official Statistician, and eliminates all confusing intercorporate interests, the same as if the government operated all the railways as a single system :

INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES, CONSIDERED AS A SYSTEM FOR THE YEARS 1915 AND 1914.

Item	Amount	
	1915 Bureau's Figures	1914 Official Figures (a)
Miles Represented.....	247,312	245,625
Operating Revenue:		
From Passengers.....	\$ 653,975,175	\$ 700,403,353
From Freight.....	2,046,047,412	2,114,697,829
From Mail.....	57,973,106	55,062,961
From Express.....	69,784,468	75,541,569
From Switching.....	40,812,266	33,171,335
Other Revenue from Operation.....	76,827,912	68,143,061
Total Revenues from Operation....	\$2,945,420,339	\$3,047,019,908
Operating Expenses:		
Maintenance of Way and Structures..	\$ 377,358,420	\$ 419,277,779
Maintenance of Equipment.....	503,326,439	532,138,606
Traffic Expenses.....	60,508,979	63,769,677
Transportation Expenses.....	1,028,558,806	1,101,597,432
General Expenses.....	105,138,364	83,529,665
Taxes.....	138,961,081	140,531,575
Total Expenses and Taxes.....	\$2,213,852,089	\$2,340,844,734
Net Revenues from Operation.....	731,568,250	706,175,174
Net Revenue from Outside Operations..	2,075,266	d 1,490,095
Total Operating Income.....	\$ 733,643,506	\$ 704,685,079
Disposition:		
Interest on Funded Debt.....	\$ 404,085,134	\$ 412,443,080
Interest on Unfunded Debt.....	31,601,271	45,930,106
Rent paid for lease of road.....	116,852,303	122,179,765
Additions and Betterments Charged to Income.....	21,173,873	29,226,675
To Sinking Fund and Other Reserves	10,707,598	10,915,113
Total Deductions.....	\$ 584,420,179	\$ 621,694,739
Income Available for Dividends, Surplus and Deficits of Weak Companies.....	\$ 149,223,327	\$ 82,990,340

(d) Deficit.

(a) Class I and II roads only.

Stripped of all confusing duplications this table establishes the fact that, after paying operating expenses, taxes, rent of leased roads and interest charges, the railways of the United States set aside \$21,000,000 for betterments and less than \$11,000,000 for sinking fund and other reserves. After doing this there was less than \$150,000,000 from the revenues derived from transportation—that is, from fares and rates—available for dividends and surplus. The 448 roads operating 247,312 miles of line on which this revenue was earned reported the disbursement of \$172,245,552 in dividends. To do this they must have drawn on surplus or the “other income” which is mostly the return from intercorporate investments. The item of rent paid to non-operating road is distributed by them in interest and dividends on their capital investment.

The 448 roads represented in this report returned \$251,180,036 as “non-operating income,” and it is the inclusion of this item in the official income accounts that paves the way for the exaggerated reports of dividends declared with which the press is annually misled. A large share of this non-operating income is the return of money disbursed to the non-operating roads in which the operating roads hold controlling interests.

DISTRIBUTION OF TRANSPORTATION REVENUES.

In order that the student may follow the distribution of the gross revenues of the railways through the several channels by which they are restored to the public from whence they came, the next summary gives the items in greater detail than shown in the income account in comparison with similar items for 1913 and 1907:

**SUMMARY SHOWING THE DISTRIBUTION OF GROSS EARNINGS OF
247,312 MILES OF OPERATED LINE IN 1915, COMPARED WITH THE
PERCENTAGES FOR 1913 AND 1907.**

Item	Mileage		Gross Earnings	
	1915 Bureau.....	247,312	\$2,945,420,339	
	1913 Bureau.....	242,177	3,118,929,318	
	1907 Official.....	227,455	2,589,105,578	
	Amount 1915 Bureau	Per Cent of Gross Earnings		
		1915 Bureau	1913 Bureau	1907 Official
Operating Expenses:				
Maintenance of Way and Structures..	\$ 377,358,420	12.81	13.40	13.27
Maintenance of Equipment.....	503,326,439	17.09	16.39	14.22
Traffic Expenses.....	60,508,979	2.05	2.01	37.50
Transportation Expenses.....	1,028,558,806	34.92	35.16	
General Expenses.....	105,138,364	3.57	2.45	2.54
Total.....	\$2,074,891,008	70.44	69.41	67.53
Disposition of Same:				
Pay of Employees.....	\$1,272,392,851	43.20	44.05	41.42
Fuel for Locomotives.....	215,359,532	7.31	7.98	7.74
Oil, Water and Supplies for Locomo- tives.....	23,903,190	.81	.66	.88
Loss Injuries and Damage.....	65,434,303	2.22	2.26	1.83
Material for Way and Structures.....	497,801,132	16.90	3.60	15.66
Depreciation of Equipment.....			1.70	
Supplies and Expenses.....			2.02	
Stationery and Printing.....			.66	
Law Expenses.....			.35	
Advertising.....			.30	
Insurance.....			.25	
Miscellaneous, including Hire and Rent of Equipment, etc.....			5.58	
Total Expenses.....	\$2,074,891,008	70.44	69.41	67.53
Taxes.....	\$ 138,961,081	4.72	4.14	3.10
Rentals of Leased Roads.....	116,852,303	3.97	3.92	4.69
Interest on Funded Debt and Current Liabilities.....	435,686,405	14.79	13.04	13.14
Deficit of Weak Companies.....			1.30	.19
Betterments and Reserves.....	31,881,471	1.08	2.22	1.50
Other Deductions.....			1.10	1.07
Dividends and Surplus.....	147,148,071	5.00	4.92	8.78
Total.....	\$2,945,420,339	100.00	100.05	100.00
Net Deficit Outside Operations.....			(a) .05	
Gross Operating Revenues.....	\$2,945,420,339	100.00	100.00	

(a) Net profits outside operations, 1913.

The expenditures for material for way and structures in 1915 were approximately \$105,000,000 and for tools, supplies and expenses about \$72,000,000. The charge for depreciation of equipment also amounted to approximately \$72,000,000. There was a slight reduction in the expenditures for advertising, offset by an advance in legal expenses over 1913. Whether the latter are swelled to any degree by "valuation expenses" does not appear, but as reported they do not seem to reflect the full progress of the work, unless it is to be extended over a longer period than originally contemplated. At present this unnecessary work is costing the railways directly in the neighborhood of \$3,000,000 annually.

The balance of \$147,148,071 in the above table remaining for dividends and surplus falls short of the same item in the statement next preceding by \$2,075,256, which stands in the returns as "miscellaneous operating income," but is not included in the "revenues from rail operations." If it were all available for dividends, setting aside nothing for surplus and deficits of weak companies, it would pay only 2.05% on the capital stock of the 448 roads operating the 247,312 miles of line under review.

The \$435,686,405 interest on funded debt and current liabilities was less than 4% on such indebtedness.

The diagram on the back cover, showing where the railway dollar goes to, is based on the above table, as the diagram on where it comes from, is compiled from a combination of tables on pages 101 and 102.

DISTRIBUTION OF THE ITEM OF RENT.

The item of rent in the above table can be traced one step further in the Income Account of the non-operating roads as given by the Interstate Commerce Commission in its annual abstract issued to the press. These companies, as has been said, only "*maintain their corporate existence for the purpose of receiving and disbursing rentals paid by lessee roads.*"

Unfortunately the information for this statement for 1915 is not yet available, so we reproduce the official report for 1914:

CONDENSED INCOME AND PROFIT AND LOSS ACCOUNTS OF LEASED ROADS FOR THE YEARS ENDING JUNE 30, 1914, AND 1913.

Income Account	1914	1913
Gross Income from Lease of Road.....	\$110,670,101	\$124,332,275
Taxes Accrued.....	940,055	(a) 5,326,536
Net Income from Lease of Road.....	\$109,730,046	\$119,005,739
Other Income.....	6,139,973	7,777,635
Gross Corporate Income.....	115,870,019	126,783,374
Interest and Similar Deductions from Gross Income.....	64,561,479	68,568,734
Net Corporate Income.....	51,308,540	58,214,640
Disposition of Net Corporate Income:		
Dividends Declared from Current Income.....	37,227,212	38,945,422
Appropriations for Additions and Betterments.....	2,271,026	2,140,855
Miscellaneous Appropriations.....	1,178,765	1,334,011
Total.....	40,677,003	42,320,288
Balance to Credit of Profit and Loss.....	10,631,537	15,894,352
PROFIT AND LOSS ACCOUNT		
Credit Balance on June 30, 1913 and 1912	31,327,523	57,158,330
Credit Balance for Year 1914 and 1913 from Income Account.....	10,631,537	15,894,352
Total.....	40,959,060	73,052,680
Dividends Declared out of Surplus.....	34,170,961	2,250,069
Difference.....	7,788,099	70,802,611
Other Profit and Loss Items—Debit Balance.....	15,524,980	(b) 39,475,068
Balance <i>Debit</i> June 30, 1914 and 1913, Carried to Balance Sheet.....	7,736,881	(c) 31,327,523

(a) In 1913 Taxes were paid by Lessor Companies, largely discontinued in 1914.

(b) This item reduced from \$44,929,731 in official report to conform to credit balance carried to 1914. The "credit balances" never agree from year to year.

(c) Credit.

In 1910 the non-operating roads reported a credit balance of \$72,567,921. This at the end of four years has been replaced by a *debit balance* of \$7,736,881.

IX TAXES

The 448 companies reporting to this Bureau in 1915 paid \$138,-961,081 in taxes. This amount covers all but less than a million dollars of the taxes due from the non-operating companies but paid by the lessee roads. The following statement presents a review of the taxes paid by the railways of the United States since 1889:

SUMMARY OF TAXES PAID BY THE RAILWAYS OF THE UNITED STATES SINCE 1889, ANNUALLY, PER MILE AND RELATIVELY.

Year	Taxes Paid	Per Mile	Percentage of Earnings
1915 Bureau figures.....	\$138,961,081	\$562	4.72
1914 Official figures*.....	140,531,575	572	4.61
1913* " ".....	127,331,960	524	4.08
1912* " ".....	120,091,534	487	4.23
1911* " ".....	108,309,512	444	3.88
1910* " ".....	103,795,701	431	3.77
1909* " ".....	90,529,014	384	3.74
1908* " ".....	84,555,146	367	3.53
1907 " ".....	80,312,375	353	3.10
1906 " ".....	74,785,615	336	3.21
1905 " ".....	63,474,679	292	3.04
1904 " ".....	61,606,354	290	3.12
1903 " ".....	57,849,569	282	3.04
1902 " ".....	54,465,437	272	3.15
1901 " ".....	50,944,372	260	3.20
1900 " ".....	48,332,273	251	3.25
1899 " ".....	46,337,632	247	3.53
1898 " ".....	43,828,224	237	3.51
1897 " ".....	43,137,844	235	3.84
1896 " ".....	39,970,791	219	3.48
1895 " ".....	39,832,433	224	3.70
1894 " ".....	38,125,274	217	3.55
1893 " ".....	36,514,689	215	2.99
1892 " ".....	34,063,495	209	2.90
1891 " ".....	33,280,095	206	3.04
1890 " ".....	31,207,469	199	2.96
1889 " ".....	27,590,394	179	2.86
Aggregate Taxes for 27 Years.....	\$1,819,194,408		
Percentage of Increase, 1889 to 1915.....	403%	214%	65%

*Class I and II roads only. *Does not include switching and terminal companies.

For the first time in twenty-six years the railways in 1915 reported a decrease in taxes from the preceding year and also in taxes per mile, except in 1896.

TAXES BY STATES IN 1914.

The next table gives the taxes by states in 1914, as reported to the Commission, arranged in the order of amount per mile.

SUMMARY SHOWING RAILWAY TAXES BY STATES AND PER MILE OF
LINE IN 1914.
(Class I and II roads only.)

STATE	Amount	Per Mile of Line
1 New Jersey.....	\$ 6,604,781	\$3,068
2 Rhode Island.....	365,252	1,845
3 District of Columbia.....	57,394	1,678
4 Massachusetts.....	3,232,883	1,550
5 New York.....	10,709,722	1,311
6 Ohio.....	9,235,378	1,032
7 Connecticut.....	1,013,836	1,017
8 Washington.....	4,860,509	995
9 Pennsylvania.....	8,824,383	821
10 Maryland.....	983,434	732
11 Oregon.....	1,730,265	683
12 Illinois.....	8,097,545	675
13 Indiana.....	4,880,652	670
14 California.....	4,925,589	665
15 Idaho.....	1,738,925	662
16 New Hampshire.....	809,313	649
17 Wisconsin.....	4,387,545	619
18 Kentucky.....	2,183,544	619
19 Minnesota.....	5,396,777	605
20 Virginia.....	2,428,900	579
21 West Virginia.....	1,760,479	557
22 Oklahoma.....	3,391,688	545
23 Utah.....	1,096,726	541
24 Arizona.....	1,133,451	525
25 Michigan.....	4,316,394	519
26 Vermont.....	499,224	509
27 Maine.....	1,060,336	496
28 Nevada.....	983,927	472
29 Arkansas.....	2,018,598	466
30 Tennessee.....	1,644,120	448
31 Wyoming.....	789,340	448
32 Delaware.....	149,402	446
33 Montana.....	2,119,912	445
34 New Mexico.....	1,276,641	443
35 Mississippi.....	1,702,928	442
36 Nebraska.....	2,594,851	420
37 Kansas.....	3,593,097	396
38 Louisiana.....	1,778,823	381
39 Colorado.....	2,026,619	372
40 Alabama.....	1,755,382	357
41 North Dakota.....	1,782,144	354
42 Iowa.....	3,283,344	337
43 North Carolina.....	1,449,443	336
44 Texas.....	4,382,809	299
45 South Carolina.....	938,990	288
46 Florida.....	1,207,574	281
47 Missouri.....	2,173,382	279
48 Georgia.....	1,820,601	277
49 South Dakota.....	1,061,203	255
Total United States.....	\$136,263,054*	\$579

*Excludes \$4,769,512 assessed by the United States Government and other smaller items on Canadian mileage.

X

DAMAGES AND INJURIES TO PERSONS

There is genuine occasion to congratulate the railways on the showing of a reduction of over \$10,000,000 in the payments on account of injuries to persons and loss and damage claims in the year 1915. The reduction was both absolute and relative as the next summary shows:

SUMMARY OF PAYMENTS ON ACCOUNT OF INJURIES TO PERSONS AND LOSS AND DAMAGE DURING THE YEARS 1915 AND 1914.

Account	Amount 1915 Bureau	Amount 1914 Official*	Per Cent of Earnings	
			1915	1914*
Injuries to Persons:				
Maintenance of Way.....	\$ 3,112,416	\$ 3,138,147		
Maintenance of Equipment.....	2,214,786	2,537,698		
Transportation.....	21,993,047	27,045,968		
Total	\$27,320,249	\$32,721,813	.928	1.074
Loss and Damage:				
To Freight.....	\$29,876,936	\$33,279,057		
To Baggage.....	2,225,893	296,804		
To Property.....	4,065,217	4,365,833		
To Live Stock, etc.....	3,946,008	4,857,006		
Total, Loss and Damage.....	\$38,114,054	\$42,798,700	1.294	1.404
Grand Total.....	\$65,434,303	\$75,520,513	2.222	2.478

*Class I and II roads only, those having \$100,000 or more revenue yearly, switching and terminal companies excluded.

It is unfortunately true that the improvement in this item of unremunerative expenditure does not extend to Group IX, where the Texan claim agent continues to ply his trade with results that cost the railways of that territory over 4% of their operating revenues annually. In 1915 the railways of Group IX paid over \$4,775,000 for injuries and loss and damage claims against \$4,845,000 in 1914, and their operating revenues were less in 1915 by over \$7,000,000!

The next table shows how the trend of these unremunerative expenditures has been steadily upwards since 1899:

PAYMENTS ON ACCOUNT OF "LOSS AND DAMAGE" AND "INJURIES TO PERSONS" 1899 TO 1915 AND PROPORTION TO GROSS EARNINGS.

Year	Loss and Damage		Injuries to Persons	
	Amount	Per Cent of Earnings	Amount	Per Cent of Earnings
1899 Official.....	\$ 5,976,082	.455	\$ 7,116,212	.541
1900 ".....	7,056,622	.474	8,405,980	.565
1901 ".....	8,109,637	.510	9,014,144	.567
1902 ".....	11,034,686	.639	11,682,756	.676
1903 ".....	13,726,508	.722	14,952,125	.739
1904 ".....	17,002,602	.861	15,838,179	.802
1905 ".....	19,782,692	.950	16,034,727	.770
1906 ".....	21,086,219	.907	17,466,864	.751
1907 ".....	25,796,083	.996	21,462,504	.829
1908* ".....	35,046,170	1.464	20,380,908	.850
1909* ".....	33,330,751	1.378	21,050,491	.870
1910* ".....	30,964,854	1.127	23,665,488	.860
1911* ".....	34,397,279	1.233	26,034,333	.933
1912* ".....	34,551,764	1.215	27,820,755	.979
1913** ".....	39,638,222	1.268	30,410,079	.973
1914** ".....	42,796,700	1.404	32,721,813	1.074
1915 Bureau.....	38,114,054	1.294	27,320,249	.928
Increase in 16 Years, per cent....	521%	184%	284%	71.5%

*Excludes switching and terminal companies.

**Class I and II roads only, those with \$100,000 or more revenue yearly.

It will be perceived that it is only when considered relatively to earnings that the payments for "loss and damage" for 1915 show a marked reduction. In the aggregate they have only been exceeded twice, in 1913 and 1914. The expenditures for injuries to persons have been exceeded three years.

The serious phase of this statement is the increase of 184% and 71.5% respectively in these payments relatively to the increase in earnings.

XI

LOCOMOTIVE FUEL

Fuel for yard and train locomotives cost the 448 roads reporting to this Bureau for 1915 the sum of \$215,359,532 against \$243,524,752 in 1914. In 1915, \$183,738,010 was paid for train fuel and \$31,621,522 for yard fuel against \$207,925,123 and \$35,599,629 respectively in 1914.

The following summary gives the expenditures of the railways for fuel since 1899, together with the proportion to operating expenses and gross operating revenues during the period:

SUMMARY OF COST OF LOCOMOTIVE FUEL AND PROPORTION TO EARNINGS AND EXPENSES OF AMERICAN RAILWAYS, 1915 TO 1899, WITH PRICE OF BITUMINOUS COAL PER TON DURING THE SAME PERIOD.

Year	Miles of Line Op.	Cost of Locomotive Fuel	Proportion to Operating Expenses	Proportion to Operating Revenues	Price of Coal at Mines per Ton†
1915 Bureau.....	247,312	\$215,359,532	10.379	7.31	.....
1914 ⁹⁰ Official.....	247,397	242,800,799	11.036	7.97	1.18
1913 ⁹⁰ ".....	244,418	249,507,624	11.498	7.98	1.18
1912 [*] ".....	249,852	234,246,470	11.879	8.24	1.15
1911 [*] ".....	246,238	231,693,773	12.099	8.30	1.11
1910 [*] ".....	240,831	217,780,953	11.953	7.92	1.12
1909 [*] ".....	235,402	188,735,868	11.804	7.81	1.07
1908 [*] ".....	230,494	201,905,054	12.097	8.44	1.12
1907 [*] ".....	227,455	200,261,975	11.471	7.74	1.14
1906 [*] ".....	222,340	170,499,133	11.119	7.34	1.11
1905 [*] ".....	216,973	156,429,245	11.278	7.51	1.06
1904 [*] ".....	212,243	158,048,886	12.128	8.05	1.10
1903 [*] ".....	205,313	146,509,031	11.675	7.70	1.24
1902 [*] ".....	200,154	120,074,192	10.776	6.96	1.12
1901 [*] ".....	195,562	104,926,568	10.602	6.61	1.05
1900 [*] ".....	192,556	90,593,965	9.809	6.09	1.04
1899 [*] ".....	187,535	77,187,344	9.478	5.88	.87

†These figures are from the latest report of the United States Geological Survey.

⁹⁰Omits switching and terminal companies.

^{*}Class I and II roads only, those with revenues of \$100,000 or more yearly

Relatively to expenses the cost of fuel in 1915 was the lowest in fifteen years, and relatively to operating revenues it was the lowest since 1902, although practically the same as in 1906 when the price was considerably lower.

XII

ACCIDENTS

Complete immunity from fatalities to passengers in accidents to trains was attained by 325 companies operating 161,948 miles of line in the United States in 1915. No such record of safe operation has been approached by the railways of any other country in the world. This mileage operated without a single fatality in a train accident in 1915 was equal to the entire mileage of Europe, including the British Isles, in 1896, or excluding them in 1902. The attendant traffic to this remarkable demonstration of the safe operation of American railways is shown in the following summary:

SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE YEARS 1915, 1914 AND 1913:

	1915	1914	1913
Number of Operating Companies.....	325	315	299
Mileage of These Companies.....	161,948	113,333	120,901
Passengers Carried.....	485,166,546	458,661,601	409,808,488
Passengers Carried 1 Mile.....	18,083,050,000	15,304,120,000	14,400,992,000
Tons of Freight Carried.....	1,217,959,477	1,002,185,285	968,764,956
Tons of Freight Carried 1 Mile.....	184,966,034,000	147,009,326,000	141,790,227,000
Passengers Killed in Train Accidents.....	None	None	None
Passengers Injured in Train Accidents.....	2,869	2,658	3,724

These figures almost stagger comprehension. When in 1901 the British railways went through the year without a fatality to a passenger due to a train accident, the fact was heralded around the world as a marvel of safe train operation and was used to the disparagement of American railways, although the latter were operating almost ten times as many miles of line. As the railways of no other country afford any basis for comparison it may aid the reader to comprehend the full meaning of the above achievement if he will compare the figures with those for the United States in 1891 when the mileage used in the Commission's computations was 161,275 miles as follows:

	1891
Miles of single track in United States.....	161,275
Passengers carried	531,183,998
Passengers carried one mile.....	12,844,243,881
Tons of freight carried.....	675,608,323
Tons of freight carried one mile.....	81,073,784,121
Passengers killed in train accidents.....	110
Passengers injured in train accidents.....	1,494

From this it will be perceived that the railways operating with complete immunity from fatalities in train accidents in 1915 had a mileage exceeding that of all the railways in the United States in 1891, but handle 40% more passenger traffic and more than double the freight traffic. And yet the difference in immunity from fatalities in train accidents was the incalculable difference between a cipher and 110!

The chief contributing factors in this immunity were the "Safety First" movement, which has accomplished more in a few years for safe train operation than all the patent devices since Stephenson ran his first locomotive, and the nation wide depression of business. Railway travel is safer in hard times than in good times. There is less heedless rush and there are more experienced men on duty at every point. The railways were safer in 1915 than in 1913 because there were 300,000 fewer employees. In hard times the reduction of forces always strikes the less efficient and less experienced employees.

TWELVE YEAR RECORD OF IMMUNITY.

From the next summary it will be seen that a very large proportion of the railways of the United States go through year after year without killing a single passenger in a train accident. But as the years lengthen, the unsleeping law of chance gradually depletes the ranks of immunity.

STATEMENT SHOWING NUMBER OF RAILWAYS AND MILEAGE ON WHICH NO PASSENGER HAS BEEN KILLED IN A TRAIN ACCIDENT, 1904 TO 1915:

Period Consecutive Years	Number of Companies	Miles of Line With NO Fatalities to Passengers in Train Accidents
Twelve years, 1904-1915.....	3	1,073
Eleven " 1905-1915.....	23	5,012
Ten " 1906-1915.....	39	6,855
Nine " 1907-1915.....	48	7,522
Eight " 1908-1915.....	68	10,645
Seven " 1909-1915.....	77	16,737
Six " 1910-1915.....	87	18,588
Five " 1911-1915.....	107	29,208
Four " 1912-1915.....	136	36,151
Three " 1913-1915.....	178	52,568
Two " 1914-1915.....	232	87,404
One year, 1915.....	325	161,948

Almost as phenomenal as the record for 1915 is that of the 232 roads with a mileage of 87,404 which went through two years without a fatality to a passenger due to a train accident. This is equivalent to double the number of roads and mileage for a period of one year.

ELEVEN ROADS WITHIN ONE OF PERFECT IMMUNITY.

Complementary to the foregoing record of perfect immunity, but separated from it by a single fatality due to a train accident in the case of each road, is the following accident and traffic summary of eleven other roads:

SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH ONLY ONE PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE YEARS 1915, 1914 AND 1913.

	1915	1914	1913
Number of Operating Companies.....	11	23	15
Mileage of These Companies.....	25,157	34,826	25,361
Passengers Carried.....	44,073,328	115,198,252	73,639,499
Passengers Carried 1 Mile.....	2,774,723,000	4,930,170,000	3,113,427,000
Tons of Freight Carried.....	85,428,301	264,749,662	174,339,862
Tons of Freight Carried 1 Mile.....	20,240,481,000	45,379,835,000	29,003,500,000
Passengers Killed in Train Accidents.....	11	23	15
Passengers Injured in Train Accidents.....	981	1,399	1,157

Combining this table with that of complete immunity preceding, it appears that 336 American railways, operating 187,105 miles, or equal to the entire mileage of the railways of Europe, exclusive of the British Isles, in 1911, went through the year 1915 with only 11 fatalities to passengers in train accidents. This in itself is an achievement without parallel in the railway history of the world. Moreover the American railways concerned in this miracle of safe operation handled more traffic than all the other railways of the world combined.

RAILWAY ACCIDENTS IN 1915.

With these figures of the remarkable safety of railway operation in mind, the reader may turn to a consideration of the number of casualties to persons in railway accidents as reported to the Commission monthly in 1915 and 1914 and the totals of killed and injured since 1889:

**SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR
THE YEARS 1915 AND 1914 AND ANNUAL FIGURES SINCE 1899.**

	1915		1914	
	Killed	Injured	Killed	Injured
Passengers—				
In Collisions.....	39	1,689	31	3,016
Deraillments.....	41	2,113	40	2,941
Other Accidents to Trains.....	3	116	.....	36
Other Causes.....	113	6,361	152	7,047
Total Passengers.....	196	10,279	223	13,040
Employees on Duty—				
In Collisions.....	76	1,369	224	2,250
In Deraillments.....	127	1,348	211	1,520
In Other Accidents to Trains.....	18	654	17	753
In Coupling Accidents.....	90	1,993	171	2,692
Overhead Obstructions, etc.....	45	1,083	89	1,490
Falling from Cars, Getting on or off Cars, etc.....	368	10,748	497	14,563
Other Causes.....	870	20,865	1,314	27,273
Total Employees on Duty.....	1,594	38,060	2,523	50,841
Total Passengers and Employees on Duty.....	1,790	48,339	2,746	63,881
Employees Not on Duty—				
In Train Accidents.....	5	72	5	117
In Coupling Accidents.....	.....	1	.....	2
Overhead Obstructions, etc.....	.....	10	3	5
Falling from Cars, etc.....	45	287	54	370
Other Causes.....	165	470	265	603
Total.....	215	840	327	1,097
Other Persons, Not Trespassing*—				
In Train Accidents.....	13	840	23	1,156
Other Causes.....	1,176	6,381	1,326	6,900
Total.....	1,189	7,221	1,349	8,056
Trespassers—				
In Train Accidents.....	88	161	75	178
Other Causes.....	4,996	6,287	5,396	6,176
Total.....	5,084	6,448	5,471	6,354
Total Accidents Involving Train Operation.....	8,278	62,848	9,893	79,388
Industrial Accidents, not Involving Train Operation.....	343	99,192	409	113,274
Grand Totals 1915 and 1914, Official.....	8,621	162,040	10,302	192,662
Grand Total 1913, Official.....	10,964	200,308	.....	.....
" " 1912, " 	10,585	169,538	.....	.....
" " 1911, " 	10,396	150,159	.....	.....
" " 1910, Bureau.....	9,682	119,507	.....	.....
" " 1909, Official.....	8,722	95,626	.....	.....
" " 1908, " 	10,188	104,220	.....	.....
" " 1907, " 	11,839	111,016	.....	.....
" " 1906, " 	10,618	97,706	.....	.....
" " 1905, " 	9,703	86,008	.....	.....
" " 1904, " 	10,046	84,155	.....	.....
" " 1903, " 	9,840	76,553	.....	.....
" " 1902, " 	8,588	64,663	.....	.....
" " 1901, " 	8,455	53,339	.....	.....
" " 1900, " 	7,865	50,320	.....	.....
" " 1899, " 	7,123	44,620	.....	.....

*Includes "other persons not trespassing," "passengers on freight trains," and "persons carried under agreement or contract."

Here again the year 1915 stands out as an instance of remarkably safe railway operation. With a slight increase in the number of passengers killed in train accidents (83 in 1915 against 71 in 1914), the record shows an almost unbroken and gratifying reduction in the number of both killed and injured. The totals at the foot of the four columns merely reflect the general improvement. Where there were 10,302 killed in all classes of railway accidents in 1914, there were only 8,621 in 1915; and the number of injured dropped from 192,662 to 162,040.

The most gratifying feature of this table, however, is the decrease in the casualties to employes on duty from 2,523 killed and 50,841 injured in 1914 to 1,594 killed and 38,060 injured in 1915, a decrease of 37% and 25% respectively. Even in the fatalities to trespassers, over which the railways have such slight control, there was a decrease. The same is true of industrial casualties which are far removed from railway operation, the inclusion of which in railway statistics merely befools real conditions.

RAILWAY FATALITIES SINCE 1888.

The next statement gives the results of the Commission's compilation of statistics of railway accidents since their inauguration down to 1915, relieved of the confusing connection with the totals of injuries which have no invariable definition or unit for statistical compilation and comparison:

**SUMMARY OF PASSENGERS, EMPLOYES AND OTHER PERSONS KILLED
IN ALL RAILWAY ACCIDENTS (TRAIN ACCIDENTS, OTHER THAN
TRAIN ACCIDENTS AND INDUSTRIAL ACCIDENTS), FROM 1888 TO
1915:**

Year	Passengers	Employees On Duty	Other Persons		Total
			Trespassers	Not Tres- passing (c)	
1915 Official.....	196	1,594	5,064	1,747	8,621
1914 ".....	223	2,523	5,471	2,085	10,302
1913 ".....	336	2,989	5,558	2,131	10,964
1912 ".....	270	2,920	5,434	1,961	10,585
1911 ".....	281	2,871	5,284	1,960	10,396
1910 Bureau.....	324	3,382	4,864	1,112	9,682
1909*Official.....	(a) 253	(b) 2,610	4,944	915	8,722
1908* ".....	381	3,405	5,489	913	10,188
1907 ".....	610	4,534	5,612	1,063	11,839
1906 ".....	359	3,929	5,381	949	10,618
1905 ".....	537	3,361	4,865	940	9,703
1904 ".....	441	3,682	5,105	868	10,046
1903 ".....	355	3,606	5,000	879	9,840
1902 ".....	345	2,969	4,403	871	8,588
1901 ".....	282	(b) 2,675	4,601	897	8,455
1900 ".....	249	2,550	4,346	720	7,865
1899 ".....	239	2,210	4,040	634	7,123
1898 ".....	221	1,958	4,063	617	6,859
1897 ".....	222	1,693	3,919	603	6,437
1896 ".....	181	1,861	3,811	595	6,448
1895 ".....	170	1,811	3,631	524	6,136
1894 ".....	324	1,823	3,720	580	6,447
1893 ".....	299	2,727	3,673	647	7,346
1892 ".....	376	2,554	3,603	614	7,147
1891 ".....	293	2,660	3,465	611	7,029
1890 ".....	286	2,451	3,062	536	6,335
1889 ".....	310	1,972	Not Given	‡3,541	5,823
1888 ".....	315	2,070		‡2,897	5,282

*Omits switching and terminal companies.

‡Includes trespassers.

(a) Figures for 1909 and prior thereto presumably include some "passengers on freight trains" and "persons carried under agreement," as postal clerks, express messengers, Pullman employees, newsboys, etc., who do not ordinarily figure in passenger statistics.

(b) Figures for 1909 and prior thereto presumably include employees both on and off duty. Each year, 1901 to 1909, also includes employees killed in accidents other than from movement of trains, largely industrial accidents, as follows:

1909—252	1906—220	1904—216	1902—187
1908—270	1905—188	1903—198	1901—182
1907—310			

(c) Includes "others not trespassing"; "persons carried under agreement" (since 1910); "passengers on freight trains" (since 1910); "employees off duty" (since 1910); and "industrial accidents" (since 1910).

Here it appears that there were fewer passengers killed in all kinds of railway accidents in 1915 than in any year since 1896, although in the meantime passenger mileage has increased from 13,049,007,233 to 32,327,466,000. It also appears that there were fewer employees killed in all sorts of accidents in 1915 than in any

year since the record has been kept, although the number of employes has increased from 704,743 in 1889 to 1,567,700 in 1915. Moreover the aggregate of all classes of fatalities in 1915 was the smallest since 1902, when the freight ton mileage was only 157,289,-370,053 against 277,232,653,000 in 1915.

RELATION OF PASSENGER TRAFFIC TO FATALITIES.

In order that the reader may arrive at a true idea of the safety of railway travel relatively to railway traffic, the next table presents a comparison of the number of passengers killed in train accidents with the number carried one mile, since 1889:

PASSENGERS CARRIED ONE MILE TO ONE KILLED, 1889 TO 1915.

Year	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile to One Killed
1915 Official and Bureau	83	32,327,466,000	389,487,542
1914 Official	71	35,258,497,509	496,598,556
1913 "	141	34,575,872,980	245,218,957
1912 "	114	33,132,354,783	290,634,691
1911 "	94	33,201,694,699	353,209,518
1910 "	(a) 179	32,338,496,329	180,661,991
1909 "	102	29,109,322,589	285,385,515
1908 "	148	29,082,836,944	196,505,648
1907 "	367	27,718,554,030	72,802,600
1906 "	137	25,167,240,831	183,702,488
1905 "	(b) 350	23,800,149,436	68,000,427
1904 "	270	21,923,213,536	81,197,087
1903 "	164	20,915,763,881	127,535,745
1902 "	170	19,689,937,620	115,823,162
1901 "	110	17,353,588,444	157,759,894
1900 "	93	16,038,076,200	172,463,183
1899 "	83	14,591,327,613	175,799,127
1898 "	74	13,379,930,004	180,809,864
1897 "	96	12,256,939,647	127,676,454
1896 "	41	13,049,007,233	318,268,469
1895 "	30	12,188,446,271	406,281,542
1894 "	162	14,289,445,893	88,206,456
1893 "	100	14,229,101,064	142,291,010
1892 "	195	13,362,898,299	68,522,555
1891 "	110	12,844,243,881	116,765,853
1890 "	113	11,847,785,617	104,847,660
1889 "	161	11,553,820,445	71,762,859

(a) In 1910 and prior thereto these figures include fatalities to passengers on freight trains.

(b) In 1905 and prior thereto these figures probably include also fatalities to many other persons not covered by other returns for passengers, as "persons carried under agreement or contract," i. e., postal clerks, express messengers, Pullman employees, newsboys, etc.

Skipping 1914 the eye has to travel down the last column to 1895 before finding a year in which the proportion of passengers to one killed in a train accident was as great as in 1915, and the year 1895 was marked by a density of depression not equalled since in the annals of American railway operation.

DECREASING HAZARD TO TRAINMEN.

Every time railway engineers and trainmen move for an advance in wages, or a change in conditions that will give them ten hours' pay for eight hours or less work, they bombard the public ear with moving tales of the increased hazard of their occupation, by reason of heavier equipment, longer trains, greater speed, etc. The next table refutes this claim with the proof that the occupation of trainmen has grown steadily safer during the period that official data has been available. The risk of accidents to trainmen fluctuates from year to year, but the trend has been steadily to a greater degree of comparative safety, as this table shows:

SUMMARY SHOWING NUMBER OF TRAINMEN KILLED IN RAILWAY ACCIDENTS, 1889 TO 1915, WITH RATIO TO NUMBER EMPLOYED.

Year	Trainmen	Trainmen in Yards	Yard Trainmen Switching Crews	All Trainmen	Number of Trainmen for One Killed
1915 Official.....	409	176	299	884	285
1914 "	738	260	479	1,477	211
1913 "	869	304	527	1,700	198
1912 "	917	265	481	1,663	191
1911 "	905	313	490	1,708	183
1910 "	1,056	325	474	1,855	172
1909 "	789	270	313	1,372	206
1908 "	1,097	362	496	1,955	150
1907 "	1,507	459	630	2,596	125
1906 "	1,360	400	575	2,335	124
1905 "	1,155	386	493	2,034	123
1904 "	1,181	487	488	2,156	120
1903 "	2,021	.....	.....	2,021	123
1902 "	1,507	.....	.....	1,507	125
1901 "	1,537	.....	.....	1,537	126
1900 "	1,396	.....	.....	1,396	137
1899 "	1,155	.....	.....	1,155	155
1898 "	1,141	.....	.....	1,141	150
1897 "	976	.....	.....	976	165
1896 "	1,073	.....	.....	1,073	152
1895 "	1,017	.....	.....	1,017	155
1894 "	1,029	.....	.....	1,029	156
1893 "	1,567	.....	.....	1,567	115
1892 "	1,503	.....	.....	1,503	113
1891 "	1,533	.....	.....	1,533	104
1890 "	1,459	.....	.....	1,459	105
1889 "	1,179	.....	.....	1,179	117

Owing to the changes in classification of trainmen introduced in 1915, the showing for that year, gratifying as it is, does not truly represent the relative improvement in safety to trainmen.

Where under the previous classification there were 311,990 trainmen in the service in 1914, the total under the 1915 classification was only 252,674, a decrease of 59,316. As there was no such reduction in the train forces, it is clear that "the number of trainmen for one killed", in the above table for 1915, is too low or that for 1914 was too high. However this may be, the fact standing out in the above table that there were fewer trainmen killed in 1915 by 40% than in 1914 and by 48% than in 1913 proves that the hazard of the occupation is decreasing. The campaign for "Safety First" is being justified by results.

ACCIDENTS ON BRITISH RAILWAYS.

The long and enviable record of British railways in the matter of comparative immunity from heavy fatalities to passengers in train accidents was broken by the terrible disaster that befell a troop train in collision with two other passenger trains at Quintinshill, near Gretna, on May 22, 1915. The collision, which was due to the fault of two signalmen in giving wrong signals, resulted in the death of three officers and 212 non-commissioned officers and men, nine civilian passengers and three railway employes, and injuries to two officers and 189 non-commissioned officers and men; 51 civilian passengers and four railway employes, and ranks as the worst in the history of British railways, if not in the annals of all railway accidents. Except for this one horrible disaster, the quarter year in which it occurred had no passengers killed in train accidents.

The collision at Quintinshill, of course, does not figure in the following summary of casualties on British roads for 1914 and 1913, with totals since 1902:

SUMMARY OF CASUALTIES ON BRITISH RAILWAYS FOR 1914 AND 1913, WITH TOTALS FOR THIRTEEN YEARS.

Class	1914		1913	
	Killed	Injured	Killed	Injured
A. Passengers:				
From Accidents to Trains, Rolling Stock, Permanent Way, etc.	6	322	33	723
By Accidents from Other Causes.....	128	2,756	117	2,918
Total of Passengers.....	134	3,078	150	3,641
B. Servants of Companies or Contractors:*				
From Accidents to Trains, Rolling Stock, Permanent Way, etc.	8	115	8	145
By Accidents from Other Causes.....	469	27,103	455	29,102
Total of Servants.....	477	27,218	463	29,247
C. Other Persons:				
From Accidents to Trains, etc.....		1		3
Persons Passing over Railways at Level Crossings.....	59	39	64	46
Treepassers (including suicides).....	422	122	458	132
Persons on Business at Stations, etc., and Other Persons not Coming in Above Classifications.....	103	781	59	727
Total of Other Persons.....	584	943	581	908
Total all Classes 1914.....	1,195	31,239	1,194	33,796
" " " 1913.....	1,194	33,796		
" " " 1912.....	1,118	32,620		
" " " 1911.....	1,159	32,258		
" " " 1910.....	1,121	30,110		
" " " 1909.....	1,033	28,383		
" " " 1908.....	1,128	28,485		
" " " 1907.....	1,211	25,975		
" " " 1906.....	1,252	20,444		
" " " 1905.....	1,180	18,236		
" " " 1904.....	1,158	18,802		
" " " 1903.....	1,262	18,557		
" " " 1902.....	1,171	17,814		
Total Thirteen Years.....	15,182	336,719		

*Of contractors' servants in 1914, nine were killed and forty injured.

In explanation of the jump in injuries between 1905 and 1907, the reader may be interested in the following list of some of the minor accidents charged up against the Great Western Railway Company one month:

	Time absent from duty
Porter slipped and grazed leg.....	1 day
Porter slipped and hurt toe.....	1 day
Porter jumped on to permanent way, and hurt ankle.....	2 days
Porter, handling timber, bruised foot.....	2½ days
Stower, lifting goods, grazed arm.....	2 days
Shunter, slight strain.....	2 days
Porter, unloading goods, bruised foot.....	1 day
Porter, loading milk, injured toe.....	2 days
Porter, wheeling luggage, grazed heel.....	1 day
Laborer, unloading sleepers, bruised hand.....	2 days
Platelayer, bruised foot.....	1 day
Laborer, carrying timber, bruised foot.....	1 day
Guard slipped in walking, hurt ankle.....	1 day
Laborer, handling rail, bruised toes.....	1 day
Laborer, handling stone, bruised fingers.....	1 day
Laborer, iron plate slipped, hurt leg.....	1 day

Such is the stuff with which the statistics of injuries on British and American railways are yearly padded. Outside of railway statistics they are regarded as the petty incidents of daily life, which we are taught to make light of.

RAILWAY ACCIDENTS IN GERMANY.

In Germany a sharp distinction is made between accidents for which the management is responsible and those due to the victim's own fault or mischance, as the following summary for the years 1911, 1912 and 1913 shows:

SUMMARY OF RAILWAY ACCIDENTS IN GERMANY FOR THE YEARS 1911, 1912 AND 1913.

	1911		1912		1913	
	Killed	Injured	Killed	Injured	Killed	Injured
Passengers:						
In Accidents to Trains.....	14	324	6	348	16	533
Other Accidents:						
Without Fault of Their Own.....	3	52	1	57	3	60
As Result of Their Own Carelessness.....	98	207	124	226	97	214
Total Passengers.....	115	583	131	631	116	796
Employees on Duty:						
In Train Accidents.....	36	179	24	181	30	218
In Other Accidents:						
Through Their Own Carelessness:						
In Trains or Cars in Motion.....	64	280	82	277	92	280
In Making up Trains.....	55	263	75	273	71	239
In Coupling Cars.....	98	173	120	217	120	170
While on Tracks in Way of Moving Cars or Trains.....	243	235	295	280	349	273
Through Other Forms of Carelessness.....	67	213	86	230	85	226
Total Employees on Duty.....	563	1,343	682	1,457	747	1,406
Post, Telegraph, Police, and Customs Staff.....	13	70	15	69	13	74
Trespassers, Including Employees Not on Duty.....	324	271	326	311	363	348
Suicides.....	369	26	457	31	516	48
Total Trespassers, Etc.....	706	367	798	411	892	470
Total all Classes.....	1,384	2,293	1,611	2,499	1,755	2,672

The official German reports quite properly exclude accidents in the shops, which, combined with a sensible definition of what constitutes a reportable injury, reduces the number of injuries within reasonable bounds. The student should compare the 2,672 injured on German roads with the exaggerated figures for American and British roads.

RAILWAY ACCIDENTS IN EUROPE.

That, contrary to the general impression, railway operation is as safe in the United States as on European roads is proved by the next summary giving the totals of railway fatalities of the various countries of Europe from the latest information obtainable. In studying this table it must be remembered that we have 50,000 more miles of railway than all Europe, and that while our passenger traffic is smaller our freight traffic, the most frequent cause of accidents, is more than double that of all Europe.

KILLED IN EUROPEAN RAILWAY ACCIDENTS.

(MILES OF LINE REPRESENTED, 197,015.)

Country	Year	Pas- sengers	Em- ployes	Other Persons	Total	Preced- ing Year
United Kingdom.....	1914...	134	477	584	1,195	1,194
Germany.....	1913...	116	747	892	1,755	1,611
Russia (a).....	1910...	225	600	1,798	2,623	2,686
France.....	1911...	(b) 26	407	(c) 421	854	753
Austria.....	1912...	22	144	142	308	281
Hungary.....	1912...	20	155	228	403	394
Italy.....	1912...	32	101	269	402	347
Spain.....	1909...	11	65	242	318	303
Portugal.....	1904...				55	37
Sweden.....	1912...	31	39	64	134	90
Norway.....	1914...	5	1	11	17	20
Denmark (d).....	1914...	16	6	9	31	23
Belgium.....	1912...	11	75	80	166	164
Holland.....	1913...	6	24	39	69	59
Switzerland.....	1913...	11	44	52	107	97
Roumania.....	1914...	34	55	51	140	126
Total Europe.....	1914...	700	2,940	4,882	8,577	8,185
Europe (e).....	1913...	729	2,741	4,705	8,230	.....
".....	1912...	669	2,536	4,618	7,923	.....
".....	1911...	554	2,607	4,465	7,681	.....
".....	1910...	662	2,689	4,461	7,897	.....
".....	1909...	671	2,641	4,322	7,689	.....
".....	1908...	630	2,536	3,580	6,801	.....
".....	1907...	586	2,575	3,400	6,616	.....
".....	1906...	560	2,319	3,553	6,432	.....
".....	1905...	503	2,104	3,414	6,021	.....
".....	1904...	412	1,920	2,665	4,997	.....

(a) Exclusive of local lines and railways of Finland.

(b) In train accidents only.

(c) Excluding suicides, but including passengers killed otherwise than in train accidents.

(d) State railways only.

(e) These figures are those compiled by this Bureau each year since its organization, the details for each country appearing in the report of the Bureau for the following year.

To those who think that the heedlessness and contempt for legal prohibitions that result in such a heavy toll of accidents to trespass-

ers on railway right-of-way are peculiar to American life, the predominating number of fatalities to other persons in this table must come as a surprise. Even in Germany, where bureaucratic discipline and restrictions on the free action of the people prevail, nearly 50 per cent of the railway fatalities are accounted to trespassers or suicides.

OVERWORK AND RAILWAY ACCIDENTS.

For a third year the chief of the Commission's Division of Safety has been unable to find that any of the railway accidents investigated by him was traceable to the employe involved being on duty contrary to the provisions of the hours-of-service law. This experience merely confirms the results of the investigations of 8,882 British railway accidents by the inspectors of the British Board of Trade, set forth in the following summary, which this Bureau has compiled from the official findings since 1905:

HOURS WHEN BRITISH ACCIDENTS OCCUR.

Three Months to	Off duty	Hours on Duty when Accidents Occurred																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Sept. 30, 1914...	1	12	25	20	18	21	16	11	7	15	11	3	4	0	0	1	1	0
Dec. 31, 1914...	7	26	24	20	24	24	23	16	15	19	21	14	11	2	0	1	0	0
Mar. 31, 1915...	7	14	26	23	15	16	14	21	19	16	14	9	9	2	2	0	1	1
June 30, 1915...	2	10	15	12	8	17	14	19	13	8	9	7	3	2	0	1	0	2
Year 1915.....	17	62	90	75	65	78	67	67	54	58	55	33	27	6	2	3	2	3
" 1914.....	7	55	84	84	88	71	76	77	62	56	53	44	20	5	5	3	0	0
" 1913.....	1	77	78	92	58	72	68	72	74	77	62	43	21	3	5	1	1	0
" 1912.....	12	83	66	87	89	80	74	65	53	61	65	42	33	12	5	1	0	2
" 1911.....	10	95	88	75	90	85	58	74	74	65	73	57	35	13	5	2	1	1
" 1910.....	13	57	103	83	68	88	72	72	62	64	63	51	32	7	6	1	2	3
" 1909.....	11	61	72	92	78	69	77	68	60	65	54	51	37	8	0	0	1	0
" 1908.....	6	60	103	83	85	77	81	72	70	63	57	53	35	8	8	0	0	0
" 1907.....	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1
" 1906.....	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	0	2
" 1905.....	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	0	1
Eleven Years...	87	724	908	882	839	825	784	753	675	701	661	500	351	90	55	22	10	13

That length of time on duty has nothing to do with liability to accident is proved by this remarkable exposition. From beginning to end it testifies to the fact that accidents occur with greatest frequency during the second, third, fourth and fifth hours that men are on duty, and from the fifth hour they steadily decline. The number credited to the seventeenth hour is swelled by those that happen in subsequent periods. One of these, happening on May 19, 1915, disclosed the extraordinary fact that the victim, a capstan-

man, had been on duty for $31\frac{1}{2}$ hours, with two hours for meals. And yet his injury, a bruised leg, resulted from undue haste in getting on a wagon about to be raised before it was in position, and he was rigidly "held responsible for the accident."

Confirmation of the lesson of the above table comes in the report of the Industrial Accident Board of Massachusetts, which gives the frequency of accidents by the hours of the day. In its comment the Board says the tabulation "shows that the greatest number of accidents fall in the morning between 10 and 11 o'clock (that is, the third and fourth hours of the work day), and in the afternoon the peak is between 3 and 4 o'clock (that is, the second and third hours after the noon intermission)." The tabulation referred to shows that the peak of accidents, both fatal and non-fatal, reached between 10 and 11 o'clock in the morning, is never approached again, although the workmen continue to work in about the same numbers until 6 o'clock in the evening. The number of fatal accidents for the tenth hour is about one-quarter those for the fourth.

XIII

RAILWAY RECEIVERSHIPS

No statement in this report reflects more clearly the straits in which the railways of the United States found themselves in 1915 than the following list of companies in the hands of receivers at the close of the year, covering 38,661 miles of line and involving \$2,372,-204,457 of stocks and funded debt.

RAILWAYS IN RECEIVERS' HANDS DECEMBER 31, 1915.

Name of Road	Mileage	Date of Receivership	Capital Stock	Bonds
Alabama, Tennessee & Northern.....	194	Nov. 1915	\$ 25,000,000	\$ 5,297,000
Apalachicola Northern.....	102	May, 1914	3,000,000	2,000,000
Atlanta, Birmingham & Atlantic.....	638	Jan., 1909	35,000,000	19,172,407
Beaumont, Sour Lake & Western.....	119	July, 1913	85,000	2,067,825
Buffalo and Susquehanna Ry.....	90	May, 1910	10,000,000	6,873,750
Cape Girardeau Northern.....	106	April, 1914	110,000	1,500,000
Chicago & Eastern Illinois.....	1,282	May, 1913	25,817,800	63,155,000
Chicago, Peoria & St. Louis.....	255	July, 1914	4,000,000	5,506,000
Chicago, Rock Island & Pacific.....	8,330	April, 1915	74,482,523	267,142,789
Cincinnati, Bluffton & Chicago.....	52	March, 1908	1,125,000	1,500,000
Cincinnati, Hamilton & Dayton.....	1,003	July, 1914	8,248,175	49,607,000
Colorado Midland.....	338	Dec. 1912	7,476,100	9,460,000
Denver, Laramie & Northwestern.....	57	June, 1912	25,680,900	1,071,546
Florida Railway.....	59	June, 1915	4,000,000	1,180,000
Ft. Smith & Western.....	250	Oct., 1915	5,000,000	5,833,000
Ft. Worth & Rio Grande.....	235	July, 1913	2,928,300	4,467,000
Georgia & Florida.....	320	April, 1915	8,750,000	8,306,454
Idaho Southern.....	24	Dec. 1915	3,000,000	1,141,000
International & Gt. Northern.....	1,160	Aug., 1914	4,822,000	38,229,500
Louisiana & North West.....	121	Aug., 1913	2,300,000	1,264,619
Missouri & North Arkansas.....	365	April, 1912	8,340,000	8,340,000
Missouri, Kansas & Texas.....	3,536	Oct., 1915	76,283,257	146,455,450
Missouri, Oklahoma & Gulf.....	328	Dec., 1913	8,474,000	19,429,200
Missouri Pacific.....	3,931	July, 1915	82,841,085	161,118,500
St. Louis, Iron Mt. & Southern.....	3,363	July, 1915	44,394,739	144,331,120
New Orleans, Mobile & Chicago.....	402	Dec., 1913	9,333,250	13,686,920
New Orleans, Texas & Mexico.....	287	July, 1913	2,000,000	30,470,492
Orange & Northwestern.....	62	July, 1913	35,000	1,066,947
Pacific & Idaho Northern.....	90	Sept., 1915	2,929,800	2,646,911
Pere Marquette.....	1,795	April, 1912	26,268,410	66,672,000
Pittsburgh, Lisbon & Western.....	34		5,000,000	1,210,995
Pittsburg, Shawmut & Northern.....	184	Aug., 1905	15,000,000	14,491,600
St. Louis & San Francisco.....	4,749	May, 1913	49,985,762	287,310,928
St. Louis, Brownsville & Mexico.....	518	July, 1913	500,000	12,179,506
St. Louis, San Francisco & Texas.....	244	July, 1913	804,000	1,188,000
San Antonio, Uvalde & Gulf.....	316	Aug., 1914	280,000	4,413,000
Tennessee Central.....	294	Dec., 1912	8,000,000	12,220,900
Tennessee Railway.....	59	July, 1913		1,135,000
Toledo, St. Louis & Western.....	451	Oct., 1914	19,947,600	28,027,000
Trinity & Brazos Valley.....	303	June, 1914	304,000	17,000,156
Wabash-Pittsburg Terminal.....	63	May, 1908	10,000,000	50,236,000
Western Pacific.....	945	March, 1915	75,000,000	75,000,000
Wheeling & Lake Erie.....	512	June, 1908	36,980,400	24,329,325
32 Other Railways with funded debt under \$1,000,000 each.....	1,095		13,801,700	7,159,816
Total 75 Railways.....	38,661		\$747,308,801	\$1,624,895,656

XIV**STATISTICS OF FOREIGN RAILWAYS**

In the following pages the Bureau presents the statistics of the principal countries of the world in the most succinct form compatible with including the chief essentials. The information in these tables is derived from the official statistics of the country to which they relate and has been translated into American units by the use of the recognized and current equivalents of value and distance.

The great war has interfered with the regular issue of railway statistics in several instances. Where the data covers any period subsequent to July, 1914, the war's effect is evident in the returns; for instance, in those of Holland, Switzerland and Australia. The railways of Canada suffered from the same causes that prevailed in the United States.

NOTE—For other comparative details of foreign railway statistics, see:

	PAGES
Mileage	335-338-453
Equipment	348-350
Government ownership	336-338
Labor and compensation.....	363-370
Capitalization	377, 385-387
Rates	322, 407-408, 411
Accidents	431-436

RAILWAYS OF CANADA.

STATISTICS OF ALL RAILWAYS FOR YEARS ENDING JUNE 30, 1914 AND 1915, COMPARED WITH GOVERNMENT INTERCOLONIAL, 1915.

	Intercolonial	All Canadian Roads	
	1915	1914	1915 (e)
Miles of Line Operated.....	1,451	30,795	35,582
Second Track.....	27	2,298	2,451
Yard Track and Sidings.....	365	7,518	7,852
All Tracks.....	1,843	40,606	45,885
Capital Cost, Net			
Stock.....		\$ 853,110,653	\$ 847,801,101
Debenture Stock.....		173,307,470	176,284,883
Funded Debt.....		782,402,638	851,724,905
Government Railways.....	\$109,221,080	133,706,048	(a) 293,542,201
Subsidies.....	374,840	233,772,639	238,831,924
Total Capital Cost.....	\$109,595,920	\$2,176,299,448	\$2,408,185,013
Per Mile of Line.....	75,531	70,671	67,737
Passenger Traffic			
Passengers Carried.....	3,626,897	46,702,280	41,551,031
Passengers Carried 1 Mile.....	167,936,915	3,089,031,194	2,483,708,745
Average Journey (miles).....	46	66	54
Average Passengers per Train.....	53	59	50
Mileage of Passenger Trains.....	2,817,304	45,219,048	41,048,243
Mileage of Mixed Trains.....	351,522	7,126,841	7,736,391
Receipts from Passengers.....	\$3,062,815	\$62,012,296	\$50,173,267
Receipts per Passenger Mile (cents).....	1.824	2.007	2.021
Freight Traffic			
Tons Carried.....	4,442,510	101,393,989	87,204,838
Tons Carried 1 Mile.....	1,157,448,089	22,063,294,685	17,661,309,723
Average Haul (miles).....	261	217	202
Average Tons per Train.....	256	353	344
Freight Train Mileage.....	4,525,293	(b) 62,470,034	(b) 51,397,964
Receipts from Freight.....	\$7,131,062	\$163,663,744	\$132,543,964
Receipts per Ton Mile (mills).....	6.16	7.42	7.51
Miscellaneous Receipts.....	\$1,065,833	\$17,406,899	(c) \$17,125,831
Total Receipts.....	\$11,259,710	\$243,083,539	\$199,843,072
Expenses of Operation			
Way and Structures.....	\$ 2,116,982	\$ 35,292,226	\$ 28,762,907
Maintenance of Equipment.....	2,235,592	36,375,331	28,156,261
Traffic Expenses.....	260,369	6,546,802	5,853,632
Conducting Transportation.....	6,416,587	94,119,067	77,985,273
General Expenses.....	319,226	6,642,032	6,973,026
Total Expenses.....	\$11,348,756	\$178,975,258	\$147,731,099
Ratio to Earnings.....	100.79%	73.63%	73.94%
Net Receipts.....	(D) \$89,046	\$64,108,281	\$52,111,973
Per Cent. on Capital Cost.....		3.30	2.16
Net Per Mile.....	(D) 61	2,082	1,464
Taxes.....	Pays No Taxes	\$2,822,774	\$3,049,728
Number of Employees.....		159,142	124,142
Compensation.....		\$111,762,972	\$90,215,727
Proportion of Gross Earnings.....		45.97%	45.15%
Proportion of Operating Expenses.....		62.43%	61.09%
Average per Employe per Year.....		\$700	\$727
Locomotives.....	411	5,447	5,486
Passenger Service Cars.....	500	6,002	6,326
Freight Service Cars.....	13,407	204,190	201,600
Average Capacity Tons.....	30.5	33.2	33.4
Company Service Cars.....	732	16,353	17,026

(a) Capital cost of National Transcontinental, included herein, \$152,802,746, does not include equipment. (b) Includes mixed train mileage above. (c) Includes \$3,026,774 mail and \$6,059,385 express in 1915. (D) Deficit. (e) Report for 1915 reached Chicago too late for inclusion elsewhere

RAILWAYS OF THE UNITED KINGDOM.
STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND
EQUIPMENT FOR THE YEARS 1911, 1912 AND 1913.

	1911	1912	1913 (a)
Double Track or More (miles).....	13,106	13,139	13,392
Single Track.....	10,311	10,302	10,299
Total Length of Line.....	23,417	23,441	23,691
All Tracks, Sidings, Etc.....	54,576	54,909	55,405
Total Capitalization (paid up).....	\$6,447,969,398	(b) \$6,501,272,332	\$6,496,634,076
Capitalization per Mile of Line...	275,354	277,346	274,224
Passenger Traffic			
Passengers Carried.....	1,326,316,990	1,294,337,046	1,454,760,813
Season Ticket Journeys, in addition..	467,503,800	471,081,000	442,691,400
Passengers Carried 1 Mile.....	13,991,802,162	14,123,344,328	15,179,617,704
Average Journey (miles).....	7.8	8.0	8.0
Receipts from Passengers.....	\$215,168,940	\$215,407,648	\$229,578,676
Receipts per Passenger Mile (cents)...	1.538	1.525	1.51
Mail, Parcels, Luggage, Etc.....	\$48,612,704	\$48,830,769	\$47,903,336
Freight Traffic			
Minerals, Tons Carried.....	409,812,101	401,563,938	446,840,815
General Merchandise.....	113,766,077	118,715,190	121,360,188
Total Freight, Tons.....	523,577,178	520,279,128	(d) 568,201,003
Tons Carried 1 Mile.....	13,089,429,450	13,006,978,200	14,205,025,075
Average Haul (miles).....	25	25	25
Receipts from Freight.....	\$308,198,217	\$311,917,724	\$324,535,382
Receipts per Ton Mile (cents).....	2.354	2.398	2.23
Miscellaneous Receipts.....	(c) \$47,582,044	(c) \$49,898,999	(c) \$58,918,298
Total Receipts.....	\$619,561,905	\$626,055,140	\$660,935,692
Expenses of Operation.....	382,868,802	395,562,550	425,251,078
Ratio of Expenses to Earnings....	61.8%	63.2%	64.34%
Net Receipts.....	\$236,693,103	\$230,492,590	\$235,684,614
Percentage to Paid-Up Capital...	3.67	3.55	3.63
Gross Receipts per Mile.....	\$26,457	\$26,708	\$27,898
Gross Expenses per Mile.....	15,900	16,875	17,949
Net Receipts per Mile.....	10,557	9,833	9,949
Number of Employees (e).....	608,750	608,750	643,135
Total Compensation.....	\$164,781,320	\$170,028,613	.....
Proportion of Gross Earnings.....	26.6	27.2	.....
Proportion of Operating Expenses....	43.1	42.9	.....
Average per Employee per Year.....	\$270.70	\$279.31	.....
Taxes Included in Expenses.....	\$24,733,914	\$25,013,309	\$23,895,361
Locomotives (including electric).....	22,874	22,998	24,718
Passenger Carriages.....	.....	.....	54,455
Other Passenger Train Cars.....	.....	.....	22,159
Rail Motor Vehicles.....	.....	.....	214
Electric Cars and Trailers.....	.....	.....	2,486
Total Passenger Train Cars.....	73,074	72,888	79,314
Freight Service Cars.....	746,194	757,884	760,746
Of which "under 8 tons".....	?	?	55,512
Railway Service Vehicles.....	(f) 21,345	(f) 22,636	49,691

(a) Owing to changes in bases in 1913, consequent on requirements of Railway Companies (Accounts and Returns) Act of 1911, figures are not entirely comparable with previous years.

(b) On new basis used in 1913, capital in 1912 would be \$6,469,527,150, or \$275,992 per mile.

(c) Includes "passenger road vehicles," steamboats, canals, docks and harbors, hotels, etc.

(d) Does not include 32,899,117 head of live stock. (e) Enumerations of employees made only once every three years, latest being Dec. 31, 1913. (f) Designated only as "other carriages and waggons."

RAILWAYS OF GERMANY.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR THE YEARS 1911, 1912 AND 1913.

	1911	1912	1913
Length of State Railways (miles).....	34,814	35,257	35,699
Length of Private Railways.....	2,212	2,225	2,206
Total.....	37,026	37,482	37,904
Cost of Construction (a).....	\$4,244,187,169	\$4,392,651,229	\$4,580,404,042
Cost per Mile.....	114,145	116,662	120,355
Passenger Traffic			
Passengers Carried.....	1,642,903,860	1,743,111,677	1,797,188,599
Passengers Carried (one mile).....	23,460,306,440	24,746,513,960	25,536,352,146
Average Journey (miles).....	14.28	14.20	14.21
Receipts from Passengers.....	\$211,509,644	\$224,719,558	\$232,242,239
Receipts per Passenger Mile (cents)....	0.902	0.910	0.910
Freight Traffic			
Fast Freight and Express			
Tons Carried.....	5,166,498	5,547,977	5,716,916
Tons Carried One Mile.....	323,961,907	330,336,173	316,250,463
Average Haul (miles).....	62.70	59.54	55.32
Receipts from Same.....	\$20,636,771	\$21,741,790	\$21,813,925
Receipts per Ton Mile (cents).....	6.37	6.59	6.90
All Freight			
Tons Carried.....	570,740,986	612,385,727	618,351,064
Tons Carried One Mile.....	35,397,403,111	37,787,266,225	38,281,195,539
Average Haul (miles).....	62.01	61.70	61.91
Receipts from Freight.....	\$491,520,832	\$519,227,398	\$526,743,807
Receipts per Ton Mile (cents).....	1.39	1.37	1.37
Miscellaneous Receipts.....	\$75,403,985	\$83,473,000	\$87,364,979
Total Receipts.....	\$778,434,461	\$827,419,956	\$846,351,025
Expenses of Operation.....	512,266,834	558,230,395	592,716,555
Ratio Expenses to Earnings.....	65.81%	67.47%	70.03%
Net Receipts.....	\$266,167,627	\$269,189,561	\$253,634,470
Percentage on Cost of Construction..	6.41	6.29	5.70
Gross Receipts per Mile.....	\$21,031	\$22,063	\$22,341
Gross Expenses per Mile.....	13,840	14,898	15,646
Net Receipts per Mile.....	7,191	7,184	6,695
Number of Employees.....	716,678	743,944	786,466
Total Compensation.....	\$281,176,191	\$300,723,513	\$321,639,536
Proportion of Gross Earnings.....	36.1	36.3	38.00
Proportion of Operating Expenses.....	54.9	53.9	54.27
Average per Employee per Year.....	\$392.33	\$404.23	\$408.97
Locomotives.....	(b) 27,671	(b) 28,366	(b) 29,520
Average Weight with Tender (tons)....	53.31	50.76	55.59
Passenger Service Cars.....	78,784	82,246	86,873
Freight Service Cars.....	(c) 613,999	(c) 650,474	(c) 692,063
Average Load (tons).....	(c) 8.9	(c) 9.2	(c) 9.2

(a) On basis miles owned at end fiscal year, or 38,070 miles Dec. 31, 1913, against average operated mileage for year of 37,894. (b) Includes electric locomotives, 19 in 1913. Average weight is of steam locomotives alone. (c) Includes work cars and owners cars, 25,005 in 1913. For number and capacity of strictly freight cars, see chapter on "Equipment."

RAILWAYS OF FRANCE.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR THE YEARS 1909, 1910 AND 1911.

	1909	1910	1911
Length of State Railways (miles).....	5,502	5,533	5,559
Length of Private Railways (miles) ..	19,474	19,587	19,635
Total.....	24,976	25,100	25,194
Cost of Construction.....	\$3,593,565,914	\$3,642,672,038	\$3,720,480,021
Cost per Mile.....	144,800	146,000	148,625
PASSENGER TRAFFIC			
Passengers Carried.....	491,936,930	508,558,187	511,096,490
Passengers Carried One Mile.....	10,132,466,165	10,482,294,329	10,899,560,427
Average Journey (miles).....	20.58	20.58	21.33
Receipts from Passengers (excludes taxes).....	\$152,566,798	\$156,106,670	\$162,383,599
Receipts per Passenger Mile (cents)...	1.09	1.08	1.08
FREIGHT TRAFFIC			
Tons Carried.....	165,027,920	173,241,483	184,635,276
Tons Carried One Mile.....	13,225,376,441	13,630,172,993	14,438,559,741
Average Haul (miles).....	80.17	78.68	78.18
Receipts from Same.....	\$184,394,566	\$191,066,642	\$198,292,706
Receipts per Ton Mile (cents).....	1.32	1.33	1.30
Other Receipts.....	\$5,284,216	\$5,470,200	\$5,980,128
Total Receipts.....	\$342,245,580	\$352,643,512	\$366,656,433
Expenses of Operation.....	200,834,711	212,068,769	229,361,949
Ratio Expenses to Earnings.....	58.7%	60.1%	62.6%
Net Receipts.....	\$141,410,869	\$140,574,743	\$137,294,484
Total Net Receipts.....	141,915,519	141,110,012	137,548,035
Per Cent on Cost of Construction....	3.95	3.87	3.69
Gross Receipts per Mile.....	\$13,689	\$14,036	\$14,540
Gross Expenses per Mile.....	8,033	8,441	9,096
Net per Mile.....	5,656	5,595	5,444
Number of Employees*.....	453,099	456,657	462,590
Locomotives.....	12,542	12,840	13,434
Passenger Service Cars.....	48,701	50,247	51,144
Freight Service Cars.....	324,539	328,934	340,048

*No data as to compensation excepting in "Traction et materiel" (motive power department) where the average per employe in 1911 was \$208.63 per year.

BELGIUM AND HOLLAND.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR YEARS SPECIFIED.

	Belgium (State Rys.)		Holland (all Rys.)	
	1911	1912	1913	1914
Length of State Rys. (miles)....	2,684	2,696	1,206	1,223
Length of Private Railways.....	242	217	1,145	1,113
Total.....	2,926	2,913	c 2,351	c 2,336
Cost of Construction.....	a \$512,414,202	a \$520,777,053	b \$163,798,304	.....
Cost per Mile.....	190,914	192,770	82,810	.....
PASSENGER TRAFFIC				
Passengers Carried.....	180,840,189	191,814,188	55,810,143	48,616,973
Passengers Carried One Mile....	2,685,476,807	2,850,358,834	896,242,236	790,477,251
Average Journey (miles).....	14.85	14.86	16.06	16.2 ⁴
Receipts from Passengers.....	\$18,956,440	\$19,856,622	\$14,759,026	\$12,810,31 ³
Receipts per Pass. Mile (¢)....	0.71	0.70	1.62	1.5 ⁶
FREIGHT TRAFFIC				
Tons Carried.....	61,408,969	66,011,442	21,726,746	17,261,922
Tons Carried One Mile.....	3,167,474,621	3,441,836,586	d1,117,264,122	d1,005,920,597
Average Haul (miles).....	51.58	52.14	51.42	58.28
Receipts for Same.....	\$36,288,811	\$39,016,968	\$15,209,555	\$13,768,625
Receipts per Ton Mile (cents)...	1.14	1.13	1.36	1.36
Miscellaneous Receipts.....	\$5,332,189	\$5,065,417	.....	.....
Total Receipts.....	\$60,577,440	\$63,939,007	\$29,968,581	\$26,578,937
Expenses of Operation.....	40,654,493	44,326,853	.....	.....
Ratio Expenses to Earnings.....	67.11%	69.63%	.....	.....
Net Receipts.....	\$19,922,947	\$19,612,154	.....	.....
Per Cent on Cost of Const.....	3.66	3.80	.....	.....
Gross Receipts per Mile.....	\$22,546	\$23,695	\$12,757	\$11,369
Gross Expenses per Mile.....	15,131	16,427	.....	.....
Net Receipts per Mile.....	7,415	7,268	.....	.....
Number of Employees.....	e 70,364	e 71,907	(1912) 36,351	.....
Total Compensation.....	\$17,991,907	.....	" \$12,158,600	.....
Proportion of Gross Earnings...	29.69	.....	42.92	.....
Proportion of Operating Exp....	44.26	.....	.....	.....
Average for Employee per Year..	\$255.69	.....	.....	.....
Locomotives.....	4,217	4,288	1,295	1,314
Motor Cars.....	16	16	.....	.....
Passenger Service Cars.....	10,583	10,582	3,157	3,967
Freight Service Cars.....	84,144	85,615	27,369	26,197
Company Cars.....	2,418	2,483	.....	.....

(a) Following figures apply to state mileage only. (b) Figure for 1910, based on 1,978 miles. (c) Figures include short mileages in Germany, Belgium, etc., operated by Holland roads, amounting in 1913 and 1914 to 248 miles. 1914 figures exclude Belgian Mechelen-Terneuzen Railroad, 42 miles, not reporting. (d) Omitting one company, 42 miles, not reporting. (e) Includes laborers. Complete returns for 1912, giving compensation, have not been received, owing apparently to the war.

SWITZERLAND AND ITALY.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR THE YEARS SPECIFIED.

	Switzerland (all Rys.)		Italy (State Roads only)	
	1913	1914g	1911	1912
Length, State (miles).....	1,719	1,732	8,270	8,887
Length, Private.....	1,379	1,457	.....	.....
Total Length.....	a 3,098	a 3,189	b 8,270	b 8,837
Cost of Construction.....	\$402,351,568	\$415,261,518	.....	c\$1,334,928,118
Cost per Mile.....	129,762	132,761	.....	158,185
PASSENGER TRAFFIC				
Passengers Carried.....	128,778,634	114,819,370	86,454,345	89,690,138
Passengers Carried One Mile....	1,668,320,974	1,480,721,566	.....	.....
Average Journey (miles).....	12.95	12.90	.....	.....
Receipts from Passengers.....	\$21,421,583	\$17,734,813	\$37,444,981	\$40,796,637
Receipts per Pass. Mile (¢).....	1.28	1.20	.....	.....
FREIGHT TRAFFIC				
Tons Carried.....	19,348,509	17,097,973	35,548,954	37,145,897
Tons Carried One Mile.....	903,835,593	862,382,736	.....	.....
Average Haul.....	46.71	50.44	.....	.....
Receipts from Freight.....	\$26,288,802	\$22,778,214	\$60,539,138	\$63,721,393
Receipts per Ton Mile (cents)....	2.90	2.64	.....	.....
Other Receipts.....	\$2,066,025	\$1,907,555	\$11,391,555	\$12,050,318
Total Receipts.....	\$49,776,410	\$42,420,582	\$109,375,654	\$116,568,348
Expenses of Operation.....	33,329,586	31,860,412	92,296,415	97,871,890
Ration Expense to Earnings....	66.96%	75.11%	84.39%	83.96%
Net Receipts.....	\$16,446,824	\$10,560,170	\$17,079,239	\$18,696,458
Percentage on Cost Const....	4.09	2.54	.....	1.40
Gross Receipts per Mile.....	\$16,050	\$13,287	\$13,212	\$13,886
Gross Expenses per Mile.....	10,747	9,979	11,149	11,659
Net Receipts per Mile.....	5,303	3,308	2,063	2,227
Number of Employees.....	d 45,738	d 43,300	149,040	148,569
Total Compensation.....	\$16,697,901	\$16,646,414	\$51,479,782	\$52,657,655
Proportion of Gross Earnings...	33.45%	39.24%	47.07%	45.17%
Proportion of Operating Exp.	50.10%	52.25%	55.78%	53.80%
Average per Employee per Year.	\$367.91	\$387.06	\$345.47	\$354.43
Locomotives.....	e 1,634	e 1,651	f 4,492	f 5,110
Av. Wt. with Tender (tons)....	47.5	48.1	.....	.....
Motor Cars.....	322	329	152	150
Passenger Service Cars.....	5,737	5,880	13,737	14,005
Freight Service Cars.....	17,762	18,130	89,257	95,428
Average Capacity (tons).....	12.45	12.53	15.19	15.41
Company Service Cars.....	1,160	1,146	2,329	2,296

(a) Includes 854 miles narrow gauge and 73 miles cog railways, 1914. (b) In addition there were in 1911, 1,772 miles of private lines; in 1912, 1,892 miles. (c) Capital given is for 1913, on basis 8,439 miles. (d) Includes some in "incidental operations," not covered by compensation total, 293 in 1914. (e) Includes elect. locomotives, 111 in 1914, but weight applies to steam alone. (f) Includes electric locomotives, 50 in 1912. (g) Report for 1914 reached Chicago too late for inclusion elsewhere.

AUSTRIA AND HUNGARY.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR THE YEARS 1911 AND 1912.

	Austria (all Rys.)		Hungary (all Rys.)	
	1911	1912	1911	1912
Length of State Railways (miles).....	11,624	11,684	10,925	11,205
Length of Private Railways.....	2,470	2,501	2,087	2,098
Total.....	14,104	(a) 14,185	13,012	13,303
Cost of Construction.....	\$1,702,343,423	\$1,724,079,152	\$801,789,346	\$849,581,820
Cost per Mile.....	120,092	121,542	69,211	71,292
PASSENGER TRAFFIC				
Passengers Carried.....	276,642,501	290,850,985	153,800,002	164,008,000
Passengers Carried One Mile.....	4,932,038,000	5,159,144,000	2,958,832,300	3,134,400,080
Average Journey (miles).....	17.83	17.74	19.24	19.11
Receipts from Passengers.....	\$51,724,400	\$54,861,300	\$27,522,943	\$30,399,250
Receipts per Passenger Mile (cents).....	1.05	1.06	0.93	0.97
FREIGHT TRAFFIC				
Tons Carried.....	164,127,328	159,309,544	78,760,000	83,629,000
Tons Carried One Mile.....	10,127,018,000	10,696,550,000	5,579,502,140	5,992,787,940
Average Haul (miles).....	69.30	67.19	70.87	71.67
Receipts from Freight.....	\$147,499,800	\$160,999,300	\$74,588,087	\$80,337,656
Receipts per Ton Mile (cents).....	1.45	1.50	(b) 1.33	(b) 1.34
Miscellaneous Receipts.....	\$13,215,300	\$14,473,900	\$4,787,958	\$4,943,862
Total Receipts.....	\$212,439,500	\$230,364,400	\$106,898,968	\$115,680,768
Expenses of Operation.....	158,552,700	171,900,400	67,321,702	73,912,097
Ratio Expenses to Earnings.....	74.62%	74.62%	62.98%	63.89%
Net Receipts.....	\$53,916,800	\$58,464,000	\$39,577,266	\$41,768,671
Per Cent on Cost of Construction.....	3.17	3.28	4.39	4.39
Gross Receipts per Mile.....	\$15,062	\$16,084	\$8,091	\$8,607
Gross Expenses per Mile.....	11,239	11,987	5,095	5,456
Net Receipts per Mile.....	3,823	4,077	2,996	3,151
Number of Employees.....	(c) 276,943	(c) 280,220	(c) 136,334	(c) 147,194
Total Compensation.....	\$89,051,382	\$92,439,338	\$39,505,486	\$44,218,935
Proportion of Gross Earnings.....	41.92%	40.13%	36.96%	38.29%
Proportion of Operating Expenses.....	56.18%	53.77%	58.68%	59.53%
Average per Employee per Year.....	\$321.55	\$329.88	\$289.77	\$300.41
Locomotives.....	7,304	7,494	4,063	4,219
Motor Cars.....	216	209	.....	.....
Passenger Service Cars.....	19,195	20,028	8,724	9,142
Freight Service Cars.....	140,021	144,198	95,736	99,285

(a) 863 miles were narrow gauge, 1912.

(b) Fast freight paid 6.43 cents per ton mile in 1911 and 6.56 cents in 1912.

(c) Includes laborers.

DENMARK, NORWAY AND SWEDEN.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT IN YEARS SPECIFIED.

	Denmark, State Railways		Norway all Railways	Sweden all Railways
	1913	1914	1913-14	1912
Length, State (miles).....	1,210	1,216	1,662	2,779
Length, Private	1,105	1,117	286	(e) 5,880
Total.....	2,315	2,333	(c) 1,948	8,659
Cost of Construction.....	(a) \$75,258,132	(a) \$76,319,972	\$88,414,229	\$300,315,971
Cost per Mile.....	62,114	62,263	45,034	(d) 33,995
PASSENGER TRAFFIC				
Passengers Carried.....	22,803,161	23,690,045	18,637,638	62,957,030
Passengers Carried One Mile...	490,531,664	496,008,140	299,007,678	1,072,403,336
Average Journey (miles).....	21.51	20.96	16.00	17.05
Receipts from Passenger Traffic	\$6,444,773	\$6,523,592	\$4,182,596	\$13,796,935
Receipts per Passenger Mile (¢)	1.30	1.30	1.30	1.25
FREIGHT TRAFFIC				
Tons Carried.....	6,039,489	6,289,750	7,723,750	41,428,290
Tons Carried One Mile.....	322,661,173	334,064,863	259,972,530	1,906,914,656
Average Haul (miles).....	53.43	53.11	33.67	46.00
Receipts from Freight.....	\$7,597,064	\$7,855,222	\$4,799,013	\$27,499,811
Receipts per Ton Mile (cents)...	2.33	2.33	1.86	1.52
Other Receipts.....	\$683,584	\$741,739	\$142,026	\$2,093,549
Total Receipts.....	\$14,725,421	\$15,120,553	\$9,123,635	\$43,390,295
Expense of Operation.....	12,360,788	12,790,269	7,605,662	30,428,536
Ratio Expenses to Earnings.....	83.94%	84.59%	83.36%	(g) 70.13%
Net Receipts.....	\$2,364,633	\$2,330,284	\$1,517,973	\$12,961,759
Per Cent on Cost of Const.....	3.10	3.20	1.72	4.38
Gross Revenue per Mile.....	\$12,161	\$12,421	\$4,680	\$5,011
Gross Expense per Mile.....	10,208	10,507	3,902	3,514
Net Revenue per Mile.....	1,953	1,914	778	1,497
Number of Employees.....	13,209	13,198	7,241	(f) 48,330
Total Compensation.....	\$4,518,275	\$4,644,727	.....	\$18,578,561
Proportion of Gross Earnings...	(b) 30.7	(b) 30.7	.....	42.82
Proportion of Gross Expenses...	36.6	36.3	.....	61.05
Average per Employee per Year.	\$342.06	\$351.92	.....	\$384.41
Locomotives.....	622	629	463	1,951
Av. Wt. Tender Locos. (tons)	.....	.....	.....	48.21
Locos. with no Tenders (tons)	.....	.....	.....	24.60
Passenger Service Cars.....	1,985	2,050	970	3,820
Freight Service Cars.....	9,351	9,664	(h) 9,923	(h) 49,272
Average Capacity (tons).....	.....	.....	.....	12.6
Company Service Cars.....	63	60	.....	.....

(a) Figures hereafter apply to state railways only. (b) Proportion is smaller than it should be because large items of temporary labor are not segregated in annual report. For the same reason average pay is too high, applying only to permanent employees. (c) Only 1,203 miles standard gauge. (d) State railways alone capitalised at \$52,603 per mile, 1913; private alone \$25,446 in 1912. (e) Of the Swedish private railways 2,044 miles are narrow gauge. (f) Includes laborers. (g) Operating ratio state roads alone 75.61%; private alone, 64.33%. Sweden's ratio as a whole is low due largely to preponderance of private roads. (h) Includes baggage cars.

RUSSIA AND BULGARIA.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR YEARS SPECIFIED.

	Russia, all Rys. (a)		Bulgaria, State Rys.	
	1909	1910	1912	1913
Length, State (miles).....	28,326	28,366	1,207	1,242
Length, Private	13,256	13,256	.....	.....
Total.....	41,582	41,622	1,207	1,242
Cost of Construction	\$3,478,263,650	\$3,508,675,945	\$58,836,411	\$61,006,446
Cost per Mile.....	83,648	84,299	48,660	(d) 46,746
PASSENGER TRAFFIC				
Passengers Carried	175,054,000	195,017,000	3,341,651	1,884,946
Passengers Carried One Mile...	13,258,401,420	14,369,459,940	142,595,179	84,538,745
Average Journey (Miles).....	75.73	73.68	42.67	44.85
Receipts from Same.....	\$79,430,390	\$84,681,703	\$2,050,659	\$1,249,215
Receipts per Pass. Mile (¢)...	0.69	0.68	1.44	1.48
FREIGHT TRAFFIC				
Tons Carried.....	247,664,952	258,339,276	1,560,890	1,161,309
Tons Carried One Mile	39,906,552,540	41,605,247,868	133,146,850	109,072,725
Average Haul (miles).....	159.52	159.44	85.31	93.92
Receipts from Same.....	\$334,824,519	\$359,019,243	\$2,439,558	\$2,119,241
Receipts per Ton Mile (cents)...	0.90	0.94	1.83	1.94
Other Receipts.....	.....	.....	\$293,518	\$226,187
Total Receipts.....	(b) \$465,082,015	(b) \$499,101,318	\$4,783,735	\$3,594,643
Expenses of Operation.....	340,314,051	335,360,716	3,726,216	3,476,827
Ratio Expenses to Earnings....	73%	67%	78%	96.71%
Net Receipts.....	\$124,767,964	\$163,740,602	\$1,057,519	\$117,816
Per Cent on Cost of Const....	3.59	4.66	1.80	0.19
Gross Receipts per Mile.....	\$11,698	\$12,487	\$3,959	\$2,894
Gross Expenses per Mile.....	8,559	8,390	3,084	2,799
Net Receipts per Mile.....	3,139	4,097	875	95
Number of Employees.....	(c) 797,926	(c) 771,938	(e) 4,864	(e) 4,864
Total Compensation.....	\$162,487,101	\$163,149,009	\$1,291,566	.....
Proportion of Gross Earnings...	34.94	32.69	26.99	.....
Proportion of Operating Expenses.....	47.74	48.65	34.66	.....
Average per Employe per Year.	\$203.64	\$211.35	\$265.54	.....
Locomotives.....	20,044	19,984	212	.....
Motor Cars.....	.....	.....	5	.....
Passenger Service Cars.....	25,063	26,043	514	.....
Freight Service Cars.....	445,014	450,273	4,605	.....
Company Service Cars.....	.....	.....	39	.....

(a) Excepting Finland, 2,039 miles; but including Asiatic Russia, 6,149 miles state operated. Traffic returns exclude local lines, 1,445 miles. (b) After deduction of tax on passenger, baggage and freight traffic. (c) Includes laborers. (d) Based on 1,307 miles at end of year. (e) Excludes laborers, 3,323 in 1912, earning an average of \$225.23 in 1912; and 3,643 in 1913. Complete statistics 1913, delayed by war.

RAILWAYS OF JAPAN.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT ON THE IMPERIAL GOVERNMENT RAILWAYS SINCE NATIONALIZATION.

	1907-08	1908-09	1912-13	1913-14
Length of State Railways (miles) (entirely 3½ ft. gauge)				
(a).....	3,982	4,513	5,129	5,348
Cost of Construction.....	\$190,173,728	\$376,943,494	\$466,335,640	\$486,545,748
Cost per Mile.....	47,759	83,524	89,387	90,977
PASSENGER TRAFFIC				
Passengers Carried.....	101,115,739	123,227,543	160,711,737	(c) 167,773,143
Passengers Carried One Mile...	2,353,270,765	2,743,203,558	3,626,316,499	3,690,964,619
Average Journey (miles).....	23.3	22.3	22.6	22.0
Receipts from Passengers.....	\$17,556,883	\$19,543,981	\$24,996,797	\$25,681,834
Receipts per Passenger Mile (cents).....	0.75	0.71	0.69	0.70
FREIGHT TRAFFIC				
Tons Carried.....	18,312,223	23,524,559	32,537,345	36,348,362
Tons Carried One Mile.....	1,441,125,013	1,829,429,158	2,691,464,174	3,053,852,638
Average Haul (miles).....	78.7	77.8	82.7	84.0
Receipts from Freight.....	\$14,590,721	\$17,784,792	\$24,602,391	\$26,516,358
Receipts per Ton Mile (cents).....	0.87	0.83	0.92	0.87
Terminal Charges per Ton (cents).....	11.2	10.9	(b)	(b)
Total Rate per Ton Mile (cents)	1.01	0.97	0.92	0.87
Other Receipts.....	\$2,739,976	\$2,582,018	\$4,413,631	\$4,540,335
Total Receipts.....	\$34,887,580	\$39,910,791	\$54,012,819	\$56,738,527
Expenses of Operation.....	17,875,971	21,429,818	25,006,828	27,275,623
Ratio Expenses to Earnings....	51%	54%	46.3%	48.1%
Net Receipts.....	\$17,011,609	\$18,480,973	\$29,005,991	\$29,462,904
Per Cent on Cost of Construction.....	8.94	4.90	6.22	6.06
Gross Receipts per Mile.....	\$8,761	\$8,843	\$10,531	\$10,609
Gross Expenses per Mile.....	4,489	4,748	4,876	5,100
Net Receipts per Mile.....	4,272	4,095	5,655	5,509
Number of Employees.....	88,266	89,868	109,983	112,087
Total Compensation.....	\$8,812,806	\$9,238,152	\$12,551,960	\$12,655,621
Proportion of Gross Earnings...	25.26	23.15	23.24	22.30
Proportion of Operating Expenses.....	49.30	43.11	50.20	46.39
Average per Employee per Year.	\$99.84	\$102.78	\$114.12	\$112.92
Equipment				
Locomotives.....	1,924	2,029	2,381	2,500
Average Weight (tons).....	48.0	48.8	51.6	52.9
Passenger Service Cars.....	4,989	5,268	6,148	6,453
Average Seating Capacity....	39	38	41	42
Freight Service Cars.....	32,242	32,568	40,527	42,705
Average Capacity (tons).....	7.2	7.2	8.2	8.6

(a) In addition there were operated in 1913-14, 1,061 miles of private and light railways against 768 the year before; also 697 miles by the South Manchuria Railway.

(b) Terminal charge absorbed in rate in 1913.

(c) In 1913-14, 95.3% of all passengers were 3rd class; 4.4% were 2nd class and only 0.3% 1st class

NEW SOUTH WALES, QUEENSLAND AND NEW ZEALAND STATE RAILWAYS.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR YEARS SPECIFIED.

	New South Wales		Queensland	New Zealand
	1913-1914	1914-1915	1914-1915	1913-1914
Length (miles).....	(a) 3,959	(a) 4,057	(d) 4,730	(e) 2,861
Cost of Construction.....	\$298,359,912	\$319,390,544	\$172,713,430	\$157,569,274
Cost per Mile.....	75,202	77,253	35,697	55,075
PASSENGER TRAFFIC				
Passengers Carried.....	86,328,421	88,774,451	24,257,552	(f) 13,355,893
Passengers Carried One Mile.....	1,235,024,536	1,230,901,063		
Average Journey (miles).....	14.31	13.87		
Receipts from Passengers.....	\$13,794,032	\$14,175,031	\$4,947,813	\$7,063,837
Receipts per Pass. Mile (¢).....	1.12	1.15		
FREIGHT TRAFFIC				
Tons Carried.....	13,245,842	11,920,881	4,970,873	6,019,632
Tons Carried One Mile.....	1,037,910,619	916,923,022		
Average Haul (miles).....	80.45	78.64		
Receipts from Freight.....	\$21,418,245	\$20,484,360	\$12,254,771	\$11,474,144
Receipts per Ton Mile (cents).....	(b) 1.74	(b) 1.90		
Terminal Receipts per Ton (¢).....	23.44	23.39		
Other Receipts.....	\$2,492,437	\$2,433,018	\$1,459,271	\$1,153,026
Total Receipts.....	\$37,704,714	\$37,092,409	\$18,661,855	\$19,691,007
Expenses of Operation.....	26,345,823	25,865,359	11,696,177	14,027,173
Ratio Expenses to Earnings.....	69.87%	69.73%	62.67%	71.24%
Net Receipts.....	\$11,358,891	\$11,227,050	\$6,965,678	\$5,663,834
Per Cent on Cost of Const.....	3.87	3.60	4.03	3.61
Gross Receipts per Mile.....	\$9,524	\$9,140	\$3,946	\$6,896
Gross Expenses per Mile.....	6,655	6,374	2,473	4,909
Net Receipts per Mile.....	2,869	2,766	1,473	1,987
Number of Employees.....	25,662	(c) 24,515	11,267	14,176
Total Compensation.....	\$18,732,175	\$18,167,842	\$7,314,920	\$9,578,647
Proportion of Gross Earnings.....	49.68	48.98	39.20	48.65
Proportion of Operating Expenses.....	71.10	70.24	62.54	68.29
Average per Employee per Year.....	\$729.96	\$741.09	\$649.23	\$674.28
Equipment				
Locomotives.....	1,065	1,162	625	534
Av. Tractive power (pounds).....				12,649
Passenger Service Cars.....	1,922	2,011	1,470	1,363
Freight Service Cars.....	19,103	19,584	13,208	20,251
Average Capacity (tons).....				8.4

(a) New South Wales railways are the only standard gauge system in Australia.

(b) Omits terminal receipts, 23.39 cents per ton, 1315.

(c) Exclusive of 1,561 reported "with the expeditionary forces" in the war.

(d) All 3½ ft. gauge. In addition there were 143 miles private owned railway operated by the state but not included in returns; also 297 miles operated by local authorities and companies.

(e) Entirely 3½ foot gauge.

(f) Exclusive of 287,037 season tickets, included in passenger revenues.

SOUTH AUSTRALIA, WESTERN AUSTRALIA AND VICTORIA STATE RAILWAYS.

STATISTICS OF MILEAGE, CAPITALIZATION, TRAFFIC, EMPLOYES AND EQUIPMENT FOR LATEST FISCAL YEARS.

	South Australia		Western Australia	Victoria
	1913-1914	1914-1915	1914-1915	1914-1915
Length (miles).....	(a) 1,815	(a) 2,026	(c) 3,096	(d) 3,848
Cost of Construction.....	\$76,459,667	\$82,677,522	\$82,696,067	\$254,883,503
Cost per Mile.....	41,439	38,337	26,712	65,774
PASSENGER TRAFFIC				
Passengers Carried.....	19,809,533	18,831,273	18,635,327	117,259,926
Passengers Carried One Mile...	236,764,109	215,489,152		
Average Journey.....	11.95	11.44		
Receipts from Passengers.....	(b) \$3,664,641	(b) \$2,727,259	\$3,007,483	\$11,975,617
Receipts per Passenger Mile (cents).....	1.26	1.20		
FREIGHT TRAFFIC				
Tons Carried.....	3,103,471	2,076,280	2,904,152	5,410,045
Tons Carried One Mile.....	402,356,297	237,013,829		
Average Haul.....	129.65	114.15		
Receipts from Freight.....	\$7,471,490	\$5,108,990	\$6,578,104	\$11,046,986
Receipts per Ton Mile (cents).....	1.84	2.12		
Other Receipts.....	\$246,281	\$663,742	\$438,061	\$2,111,822
Total Receipts.....	\$11,382,412	\$8,499,991	\$10,023,648	\$25,134,425
Expenses of Operation.....	7,333,075	7,054,171	7,294,413	20,039,918
Ratio Expenses to Earnings.....	64.42%	82.99%	72.77%	79.73%
Net Receipts.....	\$4,049,337	\$1,445,820	\$2,729,23	\$5,094,507
Per Cent on Cost of Construction.....	5.33	1.81	3.30	2.00
Gross Receipts per Mile.....	\$6,272	\$4,193	\$3,238	\$6,531
Gross Expenses per Mile.....	4,042	3,482	2,357	5,206
Net Receipts per Mile.....	2,230	711	881	1,325
Number of Employees.....	8,995	10,182	8,148	(e) 27,030
Total Compensation.....	\$4,707,123	\$4,204,695	\$6,439,377	\$17,859,512
Proportion of Gross Earnings..	41.36	49.47	64.24	(e)
Proportion of Operating Expenses.....	64.19	59.60	88.28	(e)
Average per Employee per Year.	\$523.30	\$412.95	\$790.30	\$660.73
Equipment				
Locomotives.....	403	455	421	791
Passenger Service Cars.....	590	627	400	1,496
Freight Service Cars.....	8,603	8,751	10,032	19,142

(a) 1,187 miles 3½ foot gauge, balance 5 foot 3 inches, in 1915.

(b) Includes mail, parcel checking and sundries.

(c) Entirely 3½ foot gauge.

(d) 122 miles 2½ foot gauge; 3,726 miles 5 foot 3 inches.

(e) Includes 13,537 employees on construction works, etc., whose compensation is included in total, embracing thus more than proper amount chargeable to railway operation.

XV

GROWTH OF AMERICAN RAILWAYS

In eighty odd years, from their small beginnings in Pennsylvania in 1827, Maryland in 1828, South Carolina in 1830, and New York and Massachusetts in 1831, American Railways show the following remarkable growth by decades since 1835:

States	1835	1840	1850	1860	1870	1880	1890	1900	1910 #	1914 †
Alabama.....	46	46	75	743	1,429	1,851	3,148	4,219	5,022	5,406
Arizona.....						384	1,061	1,511	2,097	2,273
Arkansas.....				38	256	896	2,113	3,341	5,135	5,335
California.....				23	925	2,220	4,148	5,744	7,655	8,368
Colorado.....					157	1,531	4,154	4,587	5,519	5,739
Connecticut.....		102	402	601	742	954	1,007	1,023	1,000	999
Delaware.....	16	39	39	127	224	280	328	346	335	335
Florida.....			21	402	446	530	2,390	3,272	4,370	5,120
Georgia.....		185	643	1,420	1,845	2,535	4,105	5,639	7,020	7,433
Idaho.....						220	941	1,261	2,168	2,749
Illinois.....			111	2,799	4,823	7,955	9,843	10,997	11,876	12,140
Indiana.....			228	2,163	3,177	5,454	5,891	6,469	7,420	7,476
Iowa.....				655	2,683	5,235	8,347	9,180	9,733	9,994
Kansas.....					1,501	3,439	8,806	8,719	9,007	9,257
Kentucky.....	15	28	78	534	1,017	1,598	2,694	3,059	3,518	3,780
Louisiana.....	40	40	80	335	479	633	1,658	2,824	5,469	5,720
Maine.....		11	245	472	786	1,013	1,313	1,915	2,248	2,270
Mary'd & D.C.	117	213	259	386	671	1,012	1,168	1,407	1,413	1,430
Massachusetts	113	301	1,035	1,264	1,490	1,893	2,094	2,118	2,109	2,130
Michigan.....		50	342	779	1,638	3,331	6,789	8,193	8,985	8,934
Minnesota.....					1,072	3,108	5,466	6,942	8,669	9,040
Mississippi.....			75	862	990	1,183	2,292	2,919	4,413	4,441
Missouri.....				817	2,000	4,011	5,897	6,867	8,078	8,224
Montana.....						48	2,181	3,010	4,207	4,847
Nebraska.....					1,812	2,000	5,274	5,684	6,067	6,171
Nevada.....					593	769	925	909	2,277	2,418
N. Hampshire.....		53	467	661	736	1,015	1,133	1,239	1,246	1,256
New Jersey....	99	186	206	560	1,125	1,701	2,034	2,237	2,255	2,313
New Mexico....						643	1,284	1,752	2,999	3,025
New York.....	104	374	1,361	2,682	3,928	6,019	7,462	8,121	8,416	8,530
N'th Carolina.....		53	154	937	1,178	1,499	2,904	3,808	4,734	5,419
North Dakota.....					35	635	1,940	2,731	4,201	5,160
Ohio.....		30	575	2,946	3,538	5,912	7,719	8,774	9,128	9,148
Oklahoma.....						275	1,213	2,150	5,978	6,398
Oregon.....					159	582	1,269	1,723	2,279	2,912
Pennsylvania	318	754	1,240	2,598	4,656	6,243	8,307	10,277	11,084	11,634
Rhode Island.....		50	68	106	136	210	212	212	212	206
So'th Carolina	137	137	289	973	1,139	1,429	2,096	2,795	3,410	3,687
South Dakota.....					30	630	2,485	2,850	3,948	4,238
Tennessee.....				1,253	1,492	1,824	2,710	3,124	3,809	4,106
Texas.....				307	711	3,293	7,911	9,873	14,243	15,758
Utah.....					257	770	1,090	1,547	1,986	2,098
Vermont.....			290	554	614	912	913	1,012	1,061	1,073
Virginia.....	93	147	384	1,379	1,486	1,826	3,142	3,729	4,443	4,611
Washington.....						274	1,699	2,890	4,858	5,247
West Virginia.....					387	694	1,306	2,198	3,526	3,915
Wisconsin.....			20	905	1,525	3,130	5,468	6,496	7,328	7,611
Wyoming.....						472	941	1,228	1,600	1,821
Total.....	1,098	2,818	9,021	30,635	52,922	93,671	159,271	192,940	238,609	252,231‡

* Exclusive of switching and terminal companies—1,766 miles in 1914.

‡ Includes 37 miles in District of Columbia.

GROWTH OF RAILWAYS OF THE WORLD.

In the following table is given the mileage of the principal countries in the world from the earliest date available to the latest:

Country	Miles of Road Completed									
	Opened	1840	1850	1860	1870	1880	1889	1899	1910	1915*
Great Britain..	1825	1,857	6,621	10,433	15,537	17,933	19,943	21,666	23,280	23,691
United States..	1827	2,818	9,021	30,626	52,922	93,296	160,544	.....	236,422	254,793
Canada.....	1836	16	66	2,065	2,617	7,194	12,585	17,250	24,731	35,582
France.....	1828	.....	1,714	5,700	11,142	16,275	21,899	26,229	29,364	31,737
Germany.....	1835	341	3,637	6,979	11,729	20,693	24,845	31,386	36,235	37,894
Belgium.....	1835	207	554	1,074	1,799	2,399	2,776	2,883	2,888	5,465
Austria (proper)	1837	.....	817	1,813	3,790	7,083	9,345	11,921	13,591	14,185
Russia.....	1838	.....	310	988	7,098	14,026	17,534	26,889	35,347	148,426
Italy.....	1839	13	265	1,117	3,825	5,340	7,830	9,770	10,425	10,933
Holland.....	1839	10	110	208	874	1,143	1,632	1,966	2,235	2,019
Switzerland..	1844	.....	15	653	885	1,596	1,869	2,342	2,791	3,148
Hungary.....	1846	.....	137	1,004	2,157	4,421	6,751	10,619	12,177	13,303
Denmark.....	1847	.....	20	69	470	975	1,217	1,764	2,121	2,338
Spain.....	1848	.....	17	1,190	3,400	4,550	5,951	8,252	8,961	9,517
Chili.....	1851	.....	120	.....	452	1,100	1,801	2,791	3,451	3,949
Brasil.....	1851	.....	.....	134	504	2,174	5,546	9,195	11,863	15,491
Norway.....	1854	.....	.....	42	692	970	970	1,231	1,608	1,948
Sweden.....	1856	.....	.....	375	1,089	3,654	4,899	6,663	8,321	8,984
Argentine Republic.....	1857	.....	.....	.....	637	1,536	4,506	10,013	14,111	20,593
Turkey in Europe.....	.....	.....	.....	41	392	727	1,024	1,900	1,967	1,236
Peru.....	.....	.....	.....	47	247	1,179	993	1,035	1,470	1,715
Portugal.....	.....	.....	.....	42	444	710	1,118	1,475	1,689	1,849
Greece.....	1869	.....	.....	.....	6	7	416	604	845	998
Uruguay.....	1869	.....	.....	.....	61	268	399	997	1,371	1,636
Mexico.....	1868	.....	.....	.....	215	655	5,012	8,503	14,845	15,805
Roumania.....	.....	.....	.....	.....	152	859	1,537	1,920	1,976	2,200
Australia†.....	.....	.....	.....	.....	.....	789	4,850	11,111	17,956	21,959
Japan.....	1874	.....	.....	.....	.....	75	542	3,632	5,130	6,811
British India.....	1853	.....	.....	838	4,771	9,162	15,887	23,523	30,809	34,572
China.....	1883	.....	.....	.....	.....	.....	124	401	4,997	6,109
Africa.....	.....	.....	.....	.....	.....	583	2,873	5,353	19,207	23,472

†Including New Zealand.

*Or latest figures.

†Including Finland and Asiatic Railways.

XVI

COST OF RAILWAY REGULATION

The cost of regulating American railways continues to increase in a faster ratio than anything else pertaining to them, not even excepting taxes. The record of the growth of this tax on the general revenues is given in the following table of yearly expenditures:

1888	Five Commissioners.....	\$ 97,867
1889	" ".....	149,453
1890	" ".....	180,440
1891	" ".....	214,844
1892	" ".....	221,745
1893	" ".....	217,792
1894	" ".....	209,250
1895	" ".....	216,206
1896	" ".....	234,941
1897	" ".....	234,909
1898	" ".....	237,358
1899	" ".....	238,125
1900	" ".....	243,624
1901	" ".....	255,979
1902	" ".....	271,728
1903	" ".....	296,842
1904	" ".....	321,533
1905	" ".....	330,739
1906	" ".....	382,141
1907	Seven Commissioners.....	538,827
1908	" ".....	736,530
1909	" ".....	988,936
1910	" ".....	1,163,336
1911	" ".....	1,290,978
1912	" ".....	1,469,689
1913	" ".....	1,560,404
1914	" ".....	2,094,583
1915	" ".....	3,933,925
Total 28 years.....		\$18,412,494
Increase in 27 years 3,929 per cent.		

The expenditure of the Commission on account of the physical valuation of the railways during the year 1915 was \$2,131,925.

TWO DECADES OF RAILWAY PROGRESS

RAILWAY RESULTS IN THE UNITED STATES FOR THE YEARS ENDING
JUNE 30, 1895, 1905 AND 1915 WITH PERCENTAGES OF INCREASE
IN TWENTY AND TEN YEARS.

Item (m = Thousands)	1895 Official	1905 Official	1915 Bureau	1915 Over 1895 %	1915 Over 1905 %
Population, June 30.....	68,934,000	84,084,545	100,725,000	46.1	19.8
Miles of Line (operated).....	177,746	216,973	247,312	39.1	14.0
Miles of All Track (operated).....	233,276	306,796	379,344	62.6	23.5
Net Calitalization (m).....	\$8,899,573	\$11,167,106	\$15,703,081	76.4	40.6
Net Capitalization per Mile of Line...	51,421	53,328	63,495	23.5	19.1
Net Capitalization per Mile of Track.	38,150	36,399	41,393	8.1	13.7
Revenues from Operation (m).....	\$1,075,371	\$2,082,482	\$2,941,567	173.7	41.3
Revenues per Mile Operated.....	6,050	9,598	11,894	96.6	23.9
Expenses of Operation (m).....	725,720	1,390,602	2,074,891	185.9	49.2
Expenses per Mile Operated.....	4,063	6,409	8,390	105.4	30.9
Net Revenue from Operation (m)....	349,651	691,880	866,676	147.9	25.3
Net Revenue per Mile Operated.....	1,967	3,189	3,504	78.1	9.9
Ratio of Revenues to Expenses.....	67.48%	66.78%	70.64%	4.5	5.6
Receipts from Passengers (m).....	\$252,246	\$ 472,695	\$ 653,975	159.3	38.4
Receipts from Freight (m).....	729,993	1,450,773	2,046,047	180.3	41.0
Receipts from Mail (m).....	30,970	45,426	57,973	87.2	27.6
Receipts from Express (m).....	24,285	45,149	69,784	187.3	54.5
Passengers Carried (m).....	507,421	738,835	961,351	89.4	30.1
Passengers Carried 1 Mile (m).....	12,188,446	23,800,149	32,327,466	165.2	35.8
Average Receipts per Passenger Mile.	2.040c	1.962c	2.019c (d)	1.0	2.1
Average Passengers in Train.....	38	48	56	47.4	16.7
Average Journey per Passenger (miles)	24.02	32.21	33.61	39.9	4.4
Freight Tons Carried (m).....	696,761	1,427,732	2,046,047	193.7	43.3
Freight Tons Carried 1 Mile.....	85,227,516	186,463,110	277,232,653	225.3	48.7
Average Receipts per Ton Mile (mills)	8.39	7.66	7.42 (d)	11.5 (d)	.1
Average Tons in Train.....	190	322	505	165.8	56.8
Average Haul per Ton (miles).....	122	130	156	27.9	20.0
Locomotives (number).....	35,899	48,357	65,251	82.8	34.9
Locomotives Weight on Drivers (tons)	1,340,282	2,474,490	4,485,427	234.7	81.3
Passenger Cars (number).....	33,112	40,713	54,378	64.2	33.5
Freight Cars (number).....	1,196,119	1,731,409	2,362,914	97.6	36.5
Freight Cars Capacity (tons).....	29,304,915	53,372,552	94,995,821	224.2	77.9
Employees (number).....	785,034	1,382,196	1,506,433	91.9	8.9
Employees per 100 Miles of Line.....	441	637	609	38.1 (d)	4.4
Compensation of Employees.....	\$445,508,261	\$839,944,680	\$1,271,360,438	185.4	51.4
Proportion of Gross Earnings.....	41.44%	40.34%	43.20%	4.3	7.1
Proportion of Operating Expenses....	61.38%	60.40%	61.33%	(d) 0.2	1.4
Taxes.....	\$39,832,433	\$63,474,679	138,961,081	248.9	118.9
Taxes per Mile of Line.....	224	292	561	150.4	92.1
Proportion of Gross Earnings.....	3.70%	3.04%	4.72%	27.6	55.3

(d Decrease)

RECOMMENDATIONS

If regulation of American railways is to continue along the present lines of subordinating the transportation necessities of a continent to the petty interests of individual shippers, the sectional jealousies of states, and the rivalry of communities, nothing in the way of temporary reforms can save it from the inevitable collapse into the incompetent hands of the state. Such recommendations as the writer has urged—the transfer of the bureau of Railway Statistics to the Department of Commerce and of the investigation of railway accidents to a Board of Inspectors independent of the Interstate Commerce Commission—merely scratch the epidermis of railway regulation.

The trouble with the railway situation lies deeper. Regulation under the Act of 1887 has served its purpose. It was aimed to reform abuses, to prevent preferences, to destroy discriminations, to punish rebates and prohibit unreasonable rates and fares, and to shed the purifying rays of publicity over the entire transportation field. Its object was restrictive, punitive and reformatory, nowhere expansive and broadly constructive. It was passed to bring the railway industry under the supervision of five disinterested commissioners, and all subsequent amendments have only added teeth to the harrow without providing one dollar of fertilizer to the field.

Under such regulation the future of American railways presents a long struggle against sterility.

Today the first need of American railways is a complete change in the theory and spirit of regulation. The American people will not surrender the principle of regulation, but they should insist that such regulation provides them with constantly improving transportation facilities. They want railways adapted and adaptable to the needs of a people now numbering officially over 102,000,000 souls. They need regulation that shall say to labor, you must be content with a reasonable share of the fruits of your toil; to capital, you shall be protected in your irrevocable investment in the most essential of all public utilities.

The pending proposal of a railway wage commission without authority to raise the rates that pay the wage promises fair only to betray "in deepest consequence".

Respectfully submitted,

SLASON THOMPSON.

Chicago, April, 1916.

INDEX

	Page
Accidents (see Fatal., Hazard, Safety).....	422-431
and overwork.....	436
early railways.....	12, 17
immunity.....	41, 42, 422-425
on British railways.....	431-433, 436
on European railways.....	435
on German railways.....	434
Accounting changes.....	313, 354, 357
Anti-railway agitation (see Baiting)	
Appeal to courts, Right of.....	65
Appreciation (see Dep.).....	267, 276-7
Arbitration (see Labor) bills.....	169
demanded by public.....	301
onesided.....	297, 299, 304
system criticized.....	297
western (1915).....	296 ff., 299
Atlantic & Southern Ry.....	69
Australia, railway statistics of.....	439, 450-451
Austria, railway statistics of.....	439, 446
Automatic couplings abroad.....	87
Baiting (see Leg., Reg., Pub. Attitude)	
cause receiverships.....	178
harm of.....	5, 123, 125-7, 130, 134, 136 ff.,
142, 177-9, 181, 186-7, 190-1, 195, 198, 283	
in Wisconsin.....	128
time to cease.....	288
Baltimore & Ohio, formation.....	213
Belgium, competition in.....	204
railway statistics of.....	439, 444
Block signals.....	352-3
bills affecting.....	169
Bondholders.....	392
Bonds (see Capital, Interest)	
British Rys. (see Great Britain.)	
Bulgaria, railway statistics of.....	439, 448
Burden of proof should be on shipper.....	188
Canada, early railways.....	23
government ownership fails in.....	23
railway statistics of.....	439, 440
Canals (see Waterways), Erie appropriation	
Erie, cost enlarging.....	240, 247
Erie, decline.....	219
Erie, rates on.....	239-240
Pennsylvania.....	17-19, 22
Capital, huge outlay needed.....	251
must be attracted.....	5, 180, 251
new railway.....	381, 384
rise in cost.....	124, 125
railways must compete for after war.....	180
sixth of nation's wealth.....	123
Capitalization.....	377 ff., 380, 382
early railways.....	14, 18
foreign vs. U. S.....	64, 108 ff., 385-387
not rate basis.....	61
Car surpluses and shortages.....	351
Cars (see Equipment), bills affecting.....	169
built.....	340, 348
freight, classes of.....	347
number and capacity.....	342, 343, 346, 347
performance.....	352
Casualties (see Accidents)	
Commissions (see Interstate Com. Com.; Reg.)	
growth of.....	289-291
Commodities hauled, classified.....	409
New South Wales.....	411
ton mile, data on.....	410
Competition (see Pooling) forced only in U. S.....	208
Confiscation, What is?.....	61
Consolidations, railway.....	211

	Page
Construction, cost of (see Cost).	
new railway (see Mileage Growth).....	330, 331
Co-operative fast freight lines.....	215
Cost, capital (see Capital).	
construction.....	196, 388 ff.
construction, early railways.....	14, 18
equipment rising.....	42, 196, 344 ff.
fuel.....	421
hauling passenger a mile.....	398
improvements.....	39, 180
labor (see Wages).....	
living.....	370 ff.
materials rising.....	38, 375
railways in 1915.....	388 ff.
regulation.....	42, 179, 198, 454
road and equipment.....	196, 388 ff.
Credit (see Earn. Power) breakdown unless	
fair rates.....	164
gravely affected.....	178
impaired by state regulation.....	164
Crossings, bills.....	169
Damages.....	419
Decisions by Interstate Commerce Commis-	
sioners.....	315
Defense, national (see Preparedness)	
Denmark, railway statistics of.....	439, 447
Depreciation (see Apprec.), absurdities of.....	273, 278
problems of.....	254, 264, 267, 270, 271, 273, 274
rates of, vary.....	269
Depression, begins with railways.....	230
caused by railway baiting.....	190, 191, 283
ended by war orders.....	178, 230, 321
Discrimination question of local interests.....	188
Dividends.....	412, 413
Earnings (see Revenues)	
Earning power (see Fair Ret., Investment,	
Credit).	
1889 to 1915.....	383, 412 ff.
cut by high taxes.....	107
decline in.....	
38, 110, 124, 126, 164, 195 ff., 230, 288	
low vs. Germany.....	109 ff.
low vs. other industries.....	287-8
must be protected.....	5, 57, 64, 65, 106, 124, 125,
127, 133, 164, 178, 179, 180, 192, 196,	
231, 251, 287, 288	
not based on capitalization.....	61
not based on valuation.....	62, 125
reduced by regulation.....	126
Efficiency not recent development.....	38
only thing that has saved railways.....	126
"Eight hour day" demand (see Lab.)	
98, 232, 233, 301	
Electrification costly.....	41
Employees (see Labor, Wages).....	354 ff.
fine body of men.....	233
under government ownership.....	156
England (see Great Britain)	
Equipment.....	339 ff.
bills affecting.....	169
cost (see Cost).....	
early railways.....	15, 16, 18, 19, 27, 31, 37
foreign railways.....	349, 350
maintenance task.....	39, 383
military, need of.....	90
steel.....	42, 271, 344
weight, increase.....	42
Erie Railroad, formation of.....	213
Erie war of 1853.....	35
European railways.....	439 ff.

	Page		Page
Expenditures must be constant.....	39, 180	Inclined planes, early railways.....	17, 21, 30
Expenses, 1889 to 1915.....	382, 383	Income account (see also Revs.) cal. yr. 1915, 316 ff.	
calendar year 1915.....	318, 320	1889-1915.....	382, 383
fiscal year 1915.....	412 ff.	fiscal year 1915.....	412 ff.
increase faster than revs. (see Earn. Power).....	195 ff.	Inefficiency is exception.....	196, 229, 282
U. S. vs. Germany.....	109	Injuries to persons.....	198, 419
Express, company statistics.....	402, 403	number exaggerated.....	433
railway receipts from.....	399 ff.	Interest, rise in rates of.....	124, 125
"Fair play," necessity for.....	42, 106, 180, 231	Interstate Commerce Commission (see Reg.).....	
Fair return (see Earn. Power) due from each		attitude to railways.....	56
service.....	62	"autocratic," "tyrannous".....	172 ff., 179
what is?.....	61	cost of (see Reg. Cost).....	454
Fares, passenger (see Rates—Pass.).....		criticism of.....	56, 132, 172 ff.
Fast freight lines.....	215	decisions by members.....	315
Fatalities (see Accidents).....		division by districts urged.....	5, 67
Federal control alone (see Regulation—Conflict).....		enlargement needed.....	67
Fink, Albert.....	218, 220	experienced railway men needed.....	173
Foreign ry. statistics (see various headings).....	439 ff.	forbids what itself ordered.....	176
rates (see Rates—Freight and Pass.).....		reorganisation needed.....	66
France, early railways.....	6	salaries inadequate.....	173
railways in war.....	71	overwhelming tasks, overworked.....	132, 172-174 ff.
railway statistics of.....	439, 443	powers violate government principles.....	172-3
Freight, rates (see Rates).....		Interstate commerce law, changes proposed.....	65
revenues.....	404, 406	Investment return (see Earning Power).....	
statistics.....	395, 404-407	Investors, cause of alarm among.....	125, 126
Fuel.....	17, 421	Italy, railway statistics of.....	439, 445
Full crew bill defeat in Missouri.....	171	Japan, railway statistics of.....	439, 449
bills introduced in 1915.....	168	Journey, average.....	397
Germany, accidents.....	434	vs. Germany.....	114
density population vs. U. S.....	108	Labor (see Employees, Wages, "Eight Hour").....	
density traffic vs. U. S.....	107	Brotherhoods united.....	354 ff.
equipment.....	350	Brotherhoods get lion's share.....	298, 303, 304
freight rates high.....	116-121, 408	control needed.....	98, 182, 232, 302, 456
government ownership in.....	171, 203, 204, 305	demands incessant.....	298, 300
government railways pay lower taxes.....	110	foreign.....	363-370
govt. rys. vs. private, return on.....	111	problem of railways.....	232
growth traffic and rev. fast.....	112, 117	strike threatened.....	98, 232
mileage vs. U. S.....	108	Lackawanna viaduct.....	29
passengers, classes of.....	115, 116 note, 310 note	Lake Shore & Mich. So. Ry. formed.....	35
passenger fares vs. U. S. 113, 115, 116, 310, 311		Land grants necessary.....	130
railways in war.....	79, 89, 101, 305, 322 ff.	Leased roads.....	416
railways military in purpose.....	88, 102	Legislation (see Reg.) affecting ry. op.....	168, 177
railway statistics of.....	439, 442	cost of.....	124, 127, 132 ff., 164, 175-7
railways vs. U. S.....	107 ff.	state, evils of.....	124, 127, 132 ff., 164, 175-7
sleeping cars vs. U. S.....	308 ff.	unwise, harm of (see Baiting).....	123, 125-7, 136 ff.
Government ownership (see Countries; Private		Limitations on collection reparation.....	66
Op.).....		Lobbying, railways' right to.....	189
dishonesty under.....	140 ff.	Locomotives (see Equip.) built.....	340
employees under.....	156 ff.	DeWitt Clinton vs. modern.....	31, 37
fails to give lower rates.....	64	early.....	15, 16, 31, 37
failure where exists.....	64, 139-141, 158, 171	horses used as.....	15, 34, 35
inefficient.....	140, 142, 156 ff., 171	introduction of.....	346
politics evil in.....	141, 158	number and capacity.....	340-342, 346
red tape under.....	157	Loss and damage.....	419
shall we have in U. S.?.....	156	Mail (see P. O.; Parcel Post; P. M. General)	
taxes lost under.....	110, 140, 190	cheaper than freight.....	147
undesirable.....	64, 123, 127, 158, 158, 190, 204, 305	Mail pay (see P. O.; Parcel Post).....	399 ff.
unless regulation improves.....	123, 164	facts distorted to decrease.....	149
world's mileage under.....	336-338	inadequate.....	143, 153 ff., 175, 198, 284, 399 ff.
vs. regulation.....	171 ff.	Interstate Com. Commission should con-	
Grand Central Terminal, history.....	43	trol.....	153 ff.
Grand Trunk Ry., formation.....	213	space basis unjust.....	144, 284
Great Britain, accidents.....	431-433, 436	vs. express revenues.....	148 ff., 399 ff.
government control railways in war.....	75	Maintenance expenses.....	15, 39, 383, 412
railways in war.....	75, 90, 103, 324	Materials, rising cost of (see Cost).....	
railway statistics of.....	439, 441	Maturities of railway obligations.....	384
Great Northern Ry., early history.....	49	Mileage.....	326 ff., 382, 452
Growth of railways.....	330, 331, 452, 453, 455	by states.....	327, 452
Haul, average.....	406	compared with Europe.....	106, 353
vs. Germany.....	118	foreign railways.....	336 ff., 453
Hazard of trainmen decreasing.....	430	growth of.....	330, 331, 452, 453
Headlight bills (1915).....	169	growth lagging.....	178, 186
Hill, James J., career of.....	47	growth smallest since Civil War.....	178
Holland, railway statistics of.....	439, 444	in 1837.....	6, 7
Hours of service, bills (1915).....	168	relation to area and population.....	328
Hudson River R. R. opened.....	33	territorial groups.....	329, 333
Hungary, railway statistics of.....	439, 446	world's railways.....	336 ff., 453
Improvements, cost of.....	39, 180		

	Page
Money value, U. S. vs. Germany, effect on rate comparison.....	114 note, 310
Moon bill (see P. O.).	
Net revenues (see Earn. Power, Revs.)	383, 412 ff.
Netherlands, railway statistics of.....	439, 444
New South Wales, ry. statistics of.....	411, 439, 450
New York Central, evolution of.....	30 ff., 211
New Zealand, railway statistics of.....	439, 450
Northern Pacific corner.....	50
Northern Securities Company dissolution.....	51
Norway, railway statistics of.....	439, 447
Operating officer, experiences of an.....	226
Overcapitalization disproved by valuation.....	189, 266
false charge.....	188, 189, 197, 287
Overtime premium unwise.....	300
Overwork and accidents.....	436
Ownership of railways.....	392 ff.
Parcel Post (see Mail, Post Office).	
cheaper than freight.....	147
competes with freight and exp.....	144, 145, 147 ff., 284
impairs passenger service.....	145
pays rya. half as much as exp.....	151
"steals from rya." (Taft).....	284
weight limit increased.....	154
Passengers, cost carrying.....	398
fares (see rates).....	
revenues.....	382, 397, 412
service, early sys.....	33
statistics.....	395, 397 ff.
trains, bills affecting.....	169
Pennsylvania Railroad, formation of.....	212
what could do in war.....	102
Personal injuries.....	198, 419
Politics, in Post Office.....	151 ff.
rya. should participate in.....	189
vs. railways.....	134, 137, 138, 181
Pooling (see rate wars), before commerce act.....	200 ff., 217 ff., 220
England.....	204, 205, 287
Europe.....	203
forbidden only in U. S.....	208
France.....	203
lessened abuses.....	221
necessity of.....	200
only solution of rate wars.....	217
regulated, should be allowed.....	181, 200, 202 ff., 208, 287
versus competition.....	187, 188, 202, 206, 208
Population, density U. S. vs. Europe.....	108, 115 note
half depend on railways.....	123
Portage Railway of Pa.....	17, 20
Postmaster General, autocratic power.....	146 ff., 284
Post Office (see Mail, Parcel Post) deficits.....	
growing.....	151
deficits, removal at rya. expense.....	143, 144, 148, 152
distorts facts.....	149 ff.
inefficient.....	146
Moon bill unfair.....	143 ff., 284
Moon bill, danger of.....	144 ff.
politics in.....	151 ff.
Preparedness and rya.....	88 ff., 94, 100, 102, 105 ff., 232, 306
equipment needed for.....	90 ff., 95
Prices, retail 1890-1915.....	372, 373
wholesale, 1890-1914.....	375
Private operation (see Govt. Own.), efficient.....	171
regulated, best system.....	171 ff.
world's policy.....	338
Progress, railway, two decades.....	455
Prussia (see Germany).	
Public, attitude (see Baiting) toward rya. improving.....	43, 128, 135, 138, 171, 183, 194
interest in railways.....	185, 191, 392 ff.
railways must cultivate.....	138

	Page
Public service of railways.....	394 ff.
Queensland, railway statistics of.....	439, 450
Quincy Railroad of Mass.....	6
Rails, early.....	7, 13
iron introduced.....	6
steel introduced U. S.....	35
Railways, belong to people.....	133
breaking down (see Earn. Power).....	126, 164, 178
commerce is limited by.....	124
development needed.....	5, 64, 106, 124, 125, 127, 133, 164, 192, 251
early U. S.....	6 ff., 25 ff., 30 ff.
early demand for.....	130
European beginnings.....	6
first in U. S.....	6
honestly managed.....	196, 229, 282
importance.....	57, 123 ff., 180, 185, 189, 230, 394
importance in European War (see War).....	101
in 1837, U. S.....	6, 23, 24
must be fostered. (See Earn. Power; Rys. devel.).....	
nature peculiar.....	57, 58, 65, 126, 301, 302
needs for adequate (see Earn. Power).....	127
never furnished.....	39, 180
officials, quality high.....	183
progress, two decades.....	455
restrained by low rates.....	124
U. S. best in world.....	63
U. S. vs. foreign.....	63 ff., 107 ff., 113
Rate, advances.....	62, 283, 314
case, Minn., 291; Shreveport.....	162
making, basis not capital.....	61
making, basis not valuation.....	62, 125, 273, 286
making, modern.....	224
making, power taken from rya.....	131, 136
wars (see Pool.) early.....	205, 206, 217-221
wars, killed waterways.....	222
wars, rates under.....	219
Rates, and wages.....	198, 375, 376
basis (see Rate making).....	
foreign (see Rates, freight. and pass).....	
freight.....	404, 406
freight, foreign.....	407, 408, 411, 440 ff.
freight, foreign vs. U. S.....	64, 116-121
freight, in rate wars.....	219
increases vital need (see Earn. Power).....	125, 127, 164, 199
low, prevent adequate rya.....	124, 127
low, impair credit.....	124, 164
passenger.....	397, 398
passenger, early.....	23, 27, 33
passenger, foreign.....	322, 440 ff.
passenger, foreign vs. U. S.....	113, 115, 310, 311, 322
passenger, money value reduces in comp. with German.....	114, 310
reasonableness question of judgment.....	60
reductions (see Earn. Pow. decline).....	315
satisfactory to all impossible.....	131, 132, 134
small changes mean much.....	180
sole source railway revenue.....	125
test should be broadminded.....	180
unremunerative (see Earn. Power).....	59, 136, 187, 188
Rebates.....	59
shippers part to blame.....	59
Receiverships, anti-ry. legis. cause.....	178, 195 ff.
growing longer.....	178
railways in.....	178, 438
Texas, causes of.....	195
Regulation (see I. C. C.; Legis.) "autocratic,".....	172 ff., 179
banking laws good model for.....	181
conflict, federal and state.....	5, 124, 127, 132 ff.
142, 159 ff., 162, 166, 171-2, 175-7, 180-1	
231, 285, 289, 291-3.	
cost of.....	42, 179, 198, 454
destroys momentum of railways.....	186
dishonest.....	282, 283, 285

	Page
excessive, harm (see Baiting).....	132
facilities inadequate.....	123
failure means govt. own.....	123
federal must control (see above, Conflict) 162 ff.	
growth of.....	289
improvement needed..... 5, 122 ff., 126-7, 132	
171 ff., 175, 179, 181, 184, 186, 282-3, 456	
investigation proposed.....	122, 127, 142
lacks intelligence.....	282, 283, 285
limits rys., not industries.....	126
"lopesided".....	181
more?.....	250, 282, 285
necessary.....	58
need for constructive.....	59, 127, 180, 182, 191, 231, 456
politics, danger in.....	134, 137, 138, 181
real, began in 1906.....	59
rys. breaking down under.....	126
securities (see Securities).....	
state, (see above, Conflict), affects Inter-	
state rys..... 160, 162, 164 ff., 291-293	
state affects interstate securities.....	166, 176
state complicates ry. problem.....	124
state evils of 124, 127, 132 ff., 142, 165 175, 177	
state forbids what I. C. C. orders.....	176
state growth.....	289-291
state impairs credit.....	165
state selfish.....	175-177, 180
state violates Int. Com. Law.....	160
system ideal, bad in practice.....	171, 179
"monstrosity".....	172
unified, need for (see above, Conflict).....	
unsettled questions of.....	61
Rent, distribution of.....	415
Reparation, ry. can't secure.....	60, 66
Republican platform urges fed. control.....	5
Return on capital (see Earn. Power).....	
109, 287-8, 383	
Revenues (see Earn. Power), cal. yr. 1915.....	317 ff.
fisc. yr. 1915.....	412 ff.
increase account war.....	178, 230, 321
1889-1915.....	382, 383
U. S. vs. Germany.....	109, 117
Roadbed, early rys.....	7 ff.
Russia, railway statistics of.....	439, 448
railways in war.....	322
Safety, American rys. (see Immunity).....	
41, 42, 422-431	
appliances.....	352, 353
first.....	353
Scott, Thomas A.....	212
Securities, decline in favor, cause.....	125, 126
maturities of.....	384
regulation of.....	127, 285
state reg. effect on bad.....	166, 176
state regulation selfish.....	176
Service, public, of rys.....	394 ff.
Shortages, car.....	351
Sleeping cars, U. S. vs. Europe.....	308-311
South Australia, ry. statistics.....	439, 451
Speed of travel, early..... 15, 22, 23, 30, 32-3,	
State, commerce only $\frac{1}{4}$ whole.....	163-4
regulation (see Legis., Reg.).....	
Station, Grand Central.....	43
Stations, pass., cost of.....	39, 41
Statistics innovations.....	313, 354, 357
U. S. railways.....	313 ff.
Steel equipment.....	42, 271, 344
Stockholders.....	392 ff.
Strike, threatened ry.....	98, 232
Surplus cars.....	351
Surplus, necessity for rys.....	180, 288
Sweden, railway statistics of.....	439, 447
Switching and terminal rys. mileage.....	332
Switzerland, railway statistics of.....	439, 445
railways in war.....	84
Taxes, advance in..... 42, 109 ff., 111,	
196, 362, 383, 417	
and wages.....	362

	Page
govt. ownership loses.....	110, 140, 190
high, cut earn. power.....	107
U. S. high, vs. Germany.....	109 ff.
Texas, receiverships in, causes.....	195
Thorne, Clifford, criticised.....	283
Trackage.....	331 ff., 382
Traffic, density vs. Germany.....	107, 113
statistics.....	394 ff.
U. S. vs. Germany.....	112 ff., 115-116, 121
Trainload, average.....	121, 397, 406
Trespassers, accidents to.....	426, 428
bills affecting.....	169
Trunk lines, formation of.....	211
Tunkhannock Viaduct.....	29
Undercharges.....	66
Unified ry control (see Reg. conflict).....	
United Kingdom (see Gt. Britain).....	
United States rys. (see various headings).....	
United States is World's ry. teacher.....	306
Valuation..... 188, 189, 250; 259, 286, 389	
commission needed.....	67
cost and time underestimated.....	260, 263
not rate basis.....	62, 125, 273, 286
reasons for.....	61, 259
states.....	391
will disprove overcapitalisation.....	189, 266
Value, rys. in 1915.....	388 ff.
land.....	255, 264
rys. 'right to earn on full.....	259
what is proper?.....	61, 252
Vanderbilt, Commodore.....	212
Victoria, railway statistics of.....	439, 451
Wabash reorganisation.....	285
Wages (see Arbit.; 8-hr.; Emp.; Labor).....	354 ff.
advance in vs. revs.....	38, 42, 314, 355
and rates.....	198, 302, 375, 376
and taxation.....	362
average.....	356, 361
control needed.....	98, 182, 232, 302, 456
demands incessant.....	298, 300
foreign vs. U. S.....	363-370
must hinge on rates.....	302
ratio to revs. and exp.....	359, 362
standardization upward.....	233, 297, 300
War, European, and rys.....	101, 313, 316, 321 ff.
British railways in.....	75, 90, 103, 324
French railways in.....	71
German railways in.....	79, 89, 101, 305, 322 ff.
opportunity for U. S.....	182
railway importance in.....	101, 321 ff.
Russian railways in.....	322
Swiss railways in.....	84
"War orders" save railways.....	178, 230, 321
War, railway importance in (see Preparedness).....	
what Pa. R. R. can do in.....	102 ff.
Watered stock (see Over-Capitalisation).....	
Waterways, (see Canal), appropriations.....	
modern.....	236, 237
capital vs. rys.....	19, 22, 240, 241
competition feared by early rys.....	34, 36
competition with rys.....	218, 221-2, 238, 243
decline of.....	219, 222, 237, 243, 244
disadvantages of.....	243
European unprofitable.....	239, 242
movement unsound.....	239
not cheaper than rys.....	238, 239 ff., 241-2, 244
protected against rys.....	31, 244
rates via.....	239
revived interest in.....	236, 237
rivers vs. canals.....	245
subsidies needed.....	244
succumb to rys.....	222
Western Australia, ry. statistics of.....	439, 451
Wheeling & Lake Erie R. R. origin.....	25
Wilson, President, proposes ry. investigation.....	122
Wisconsin, radicalism in.....	128
recovers sanity.....	138
World's railway mileage.....	336, 453

TABLE OF CONTENTS—1909

	Page
INTRODUCTION	3
PRE-RAILWAY ERA IN AMERICA.....	5
By F. A. Cleveland and F. W. Powell.	
FIRST ANNUAL REPORT OF THE CHIEF ENGINEER OF THE PENNSYLVANIA RAILROAD COMPANY	21
By J. Edgar Thomson.	
RAILWAYS AND THE PACIFIC NORTHWEST.....	45
By James J. Hill.	
SOUTHERN RAILWAYS AND THEIR NEEDS.....	58
By John F. Wallace.	
PROBLEMS CONFRONTING AMERICAN RAILWAYS.....	66
By Daniel Willard.	
THE RAILROAD SITUATION OF TO-DAY.....	80
By Frank Trumbull.	
TRANSPORTATION CHARGES AND PRICES.....	90
By Logan G. McPherson.	
THE FREIGHT RATE PRIMER.....	107
Issued by the N. Y. C. & H. R. R. R. Co.	
PROGRESSIVE SAFETY IN RAILWAY OPERATION.....	116
By A. H. Smith.	
RAILWAY MAIL PAY.....	142
By Julius Kruttschnitt.	
THE DIMINISHED PURCHASING POWER OF RAILWAY EARNINGS.....	165
By C. C. McCain.	
THE RAILROADS AND PUBLIC APPROVAL.....	199
By Edward P. Ripley.	
RAILROADS AND THE PUBLIC.....	205
By John C. Spooner.	
RAILROAD PROBLEMS OF TO-DAY.....	211
By J. B. Thayer.	
THE RELATION OF THE RAILROADS TO THE STATE.....	220
By W. M. Acworth, M. A.	
RAILWAY NATIONALIZATION.....	238
By Sir George S. Gibb.	
CONCERNING ADVANCES IN RAILWAY RATES.....	261
By the Senate Committee on Interstate Commerce, 1909.	
STATISTICS OF AMERICAN RAILWAYS FOR 1909.....	291
By Slason Thompson.	

TABLE OF CONTENTS—1910

	Page
INTRODUCTION	3-4
RETROSPECT OF AMERICAN RAILWAYS.....	5-26
By Henry V. Poor, 1868.	
SEVENTY-FIFTH ANNIVERSARY OF THE FIRST GERMAN RAILWAY.....	27-30
From Zeitung des Vereins Deutscher Eisenbahnverwaltungen.	
THE MINNESOTA RATE CASE.....	31-92
Findings and Decision.	
THE RAILROADS AND THE PEOPLE.....	93-109
By E. P. Ripley.	
EFFICIENCY	110-134
By Howard Elliott, Frank Trumbull and W. J. Cunningham.	
HOW IT APPEARS TO THE EMPLOYEE.....	136-147
From the Trainman's Journal.	
THE NECESSITY FOR HIGHER RATES.....	148-154
By James McCrea.	
NEEDS OF THE RAILWAYS.....	155-158
By Martin A. Knapp.	
FARMERS' SHARE OF THE CONSUMER'S COST.....	159-167
By James Wilson...	
MR. ACWORTH ON AMERICAN RAILWAYS.....	168-169
THE FARMER AND THE COST OF LIVING.....	170-177
By B. F. Yoakum.	
RAILWAY MAIL PAY PRIMER.....	178-185
CO-OPERATION	186-199
By Howard Elliott.	
HALF SLAVE AND HALF FREE.....	200-204
By H. U. Mudge.	
WATERWAYS—THEIR LIMITATIONS AND POSSIBILITIES.....	205-221
By Frederic A. Delano.	
GOVERNMENT OWNERSHIP	222-239
ITS FAILURE IN AUSTRALIA—By A. W. Pearce.	
ITS FAILURE IN FRANCE—From United Press Report, and Les Debats.	
THE PEOPLE'S INVESTMENTS IN RAILWAYS.....	240-249
By J. L. Laughlin, Ph. D.	
RAILWAY ACCOUNTS AND STATISTICS.....	250-262
By A. J. County.	
CAPITALIZATION OF RAILWAYS.....	263-272
By Frank Nay.	
THE MEASURE OF A REASONABLE RATE.....	273-282
By W. W. Finley.	
RETURN ON CAPITAL INVESTED IN MANUFACTURES, AGRICULTURE AND RAILWAYS	283-284
By L. E. Johnson.	
AUTOMATIC SIGNALS ON GERMAN RAILWAYS.....	285-292
From the Zeitung des Vereins Deutscher Eisenbahnverwaltungen.	
PREVENTION OF RAILWAY ACCIDENTS.....	293-304
By A. M. Schoyer.	
THE PENNSYLVANIA'S NEW YORK STATION.....	305-308
Illustrated.	
EDWARD H. HARRIMAN.....	309-329
By Otto H. Kahn.	
STATISTICS OF AMERICAN RAILWAYS FOR 1910.....	330-451
By Slason Thompson.	

TABLE OF CONTENTS — 1911

	PAGE
INTRODUCTION.....	3
TRAVEL FROM DETROIT TO CHICAGO IN 1833.....	5
From Life and Letters of Charles Butler.	
BRITISH RAILWAYS EIGHTY YEARS AGO.....	13
FIRST REPORT OF THE INTERSTATE COMMERCE COMMISSION.....	18
By Judge Thomas M. Cooley.	
THE REGULATION OF INTERSTATE COMMERCE.....	69
By Martin A. Knapp, Chief Justice of Court of Commerce.	
THE COMMISSION ABOVE THE COURTS.....	77
By Charles A. Prouty, Chairman of I. C. C.	
THE RAILWAY TRAFFIC MANAGER.....	88
By Franklin K. Lane, I. C. Commission.	
RAILWAY SECURITIES.....	96
Report of the Hadley Commission.	
PHYSICAL VALUATION OF THE NEW YORK, NEW HAVEN & HARTFORD R. R.....	132
Report of Prof. Geo. F. Swain, Engineer in Charge.	
PROSPECTS OF STATE OWNERSHIP IN ENGLAND AND THE UNITED STATES.....	159
By W. M. Acworth.	
RAILWAYS AND NATIONALIZATION IN THE UNITED STATES.....	173
By W. F. Allen.	
GOVERNMENT OWNERSHIP UNNECESSARY.....	185
By Fairfax Harrison.	
EFFICIENCY OF RAILWAY SERVICE IN THE UNITED STATES.....	200
By J. Kruttschnitt.	
EFFICIENCY AS THE EMPLOYEE SEES IT.....	216
By Warren S. Stone.	
ARBITRATION OF RAILWAY LABOR DISPUTES.....	225
By F. O. Melcher	
LAWS OF 1911 AFFECTING RAILWAYS.....	229
PUBLIC OPINION AND ITS EFFECT ON BUSINESS.....	234
By Howard Elliott.	
RAILWAY MAIL SERVICE.....	248
By H. P. Thrall.	
BLOCK SIGNALS AND AUTOMATIC CONTROL.....	253
Report of the Federal Board.	
RAIL RATES AND WAGES.....	273
THE CORRELATION OF AMERICAN INDUSTRIES.....	277
By L. E. Johnson.	
STATE RAILWAYS OF FRANCE.....	288
By M. Marc de Valette.	
FRENCH STATE RAILWAYS.....	294
HUMOR OF FRENCH TIME-TABLES.....	299
STRIKE AND LOCKOUT LEGISLATION.....	301
From the <i>London Engineer</i> .	
CHICAGO'S GREATEST PASSENGER STATION.....	307
(Illustrated).	
FINED FOR SQUARE DEALING.....	315
From the <i>Iron Trade Review</i> .	
RAILWAY NOTABILIA:	
PROGRESS IN STEEL PASSENGER CAR EQUIPMENT.....	325
ELIMINATING GRADE CROSSINGS IN LONG ISLAND.....	326
BRITISH AND FRENCH RAILWAY SPEED.....	327
LONDON'S DAILY RAILWAY PASSENGERS.....	330
ITALIAN STATE RAILWAY FINANCE.....	332
AMERICAN WATERWAYS SUPERIOR TO EUROPEAN.....	333
EUROPEAN RAILROADS.....	334
THE SONG OF THE AMERICAN FREIGHT CAR.....	337
STATISTICS OF AMERICAN RAILWAYS FOR 1911.....	338
By Sisson Thompson.	

TABLE OF CONTENTS — 1912

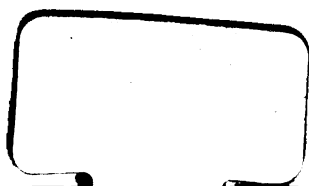
	PAGE
INTRODUCTION.....	3
ROMANCE AND REALITY.....	5
From the <i>London Times</i> .	
JAMES J. HILL'S "GREAT ADVENTURE".....	6
Letter to the Great Northern Stockholders.	
AS OTHERS SEE US.....	20
By C. Colson, Member of the Institute, France.	
EXPERIENCE OF A RAILROAD COMMISSIONER.....	42
By John B. Olmsted, Ex-Public Service Commissioner, New York.	
ADEQUATE SERVICE AND FACILITIES OBLIGATORY.....	45
By Charles A. Prouty, I. C. Commissioner.	
THE COUNTRY'S NEED OF GREATER RAILWAY FACILITIES.....	56
By James J. Hill.	
FACTS TOLD IN A WAYBILL.....	74
From the <i>Engineering News</i> .	
THE MINNESOTA RATE CASES.....	79
Opinion by Justice Hughes, of the U. S. Supreme Court.	
RAILWAY VALUATION IN KANSAS.....	147
By C. C. Witt, Engineer.	
NEW TERMINAL OF THE NEW YORK CENTRAL.....	151
(Illustrated).	
"SAFETY FIRST," THE SLOGAN.....	158
By I. C. Commissioner, C. C. McChord.	
REPORT ON COLLISION AT CORNING.....	176
By the Second District Public Service Commission of New York.	
WHY 5,000 TRESPASSERS ARE KILLED YEARLY.....	189
From the <i>Railway Age-Gazette</i> .	
TRESPASSERS KILLED ON RAILWAYS, WHO ARE THEY?.....	208
By Frank V. Whiting, Gen. Claims Atty., New York Central Lines.	
RAILWAY NATIONALIZATION.....	213
By F. H. Dent, Gen. Mgr., S. E. & C. Ry., England.	
AUSTRALIAN RAILWAYS.....	222
By the Hon. J. G. Jenkins.	
REVIEW OF THE WORKINGS OF FRENCH STATE RAILWAYS.....	233
By C. Colson, in the <i>Revue Politique</i> .	
GOVERNMENT RAILWAY OPERATION IN FRANCE.....	251
By Paul Leroy-Beaulieu.	
ARE WE READY FOR INDUSTRIAL CO-OPERATION?.....	258
By Fairfax Harrison, President, C. I. & L. Ry. Co.	
THE QUESTION OF COMPULSORY ARBITRATION.....	267
Discussion in the "Société d'Etudes Législatives."	
AVERAGE PAY OF GERMAN RAILWAY SERVANTS.....	285
By Professor Lots, of Munich.	
EARNINGS AND HOURS OF ENGLISH RAILWAY SERVANTS.....	290
From the Bulletin of the International Railway Congress.	
CANADA'S MOST SUCCESSFUL RAILWAY YEAR.....	301
By J. L. Payne, Comptroller of Statistics, Ottawa.	
RAILROAD BUILDING, SERVICE AND REVENUE.....	312
By L. E. Johnson, President, Norfolk & Western Ry. Co.	
THE OFFICE OF RAILWAY STATISTICS.....	324
Chapter I, "Manual of Railway Statistics," by George L. Boag.	
STATISTICS OF RAIL MANUFACTURE.....	334
By Paul M. La Bach, Asst. Eng., C. R. I. & P. Ry. Co.	
STATISTICS OF THE RAILWAYS OF THE UNITED STATES FOR 1912.....	336
By Slason Thompson.	
INDEX.....	466

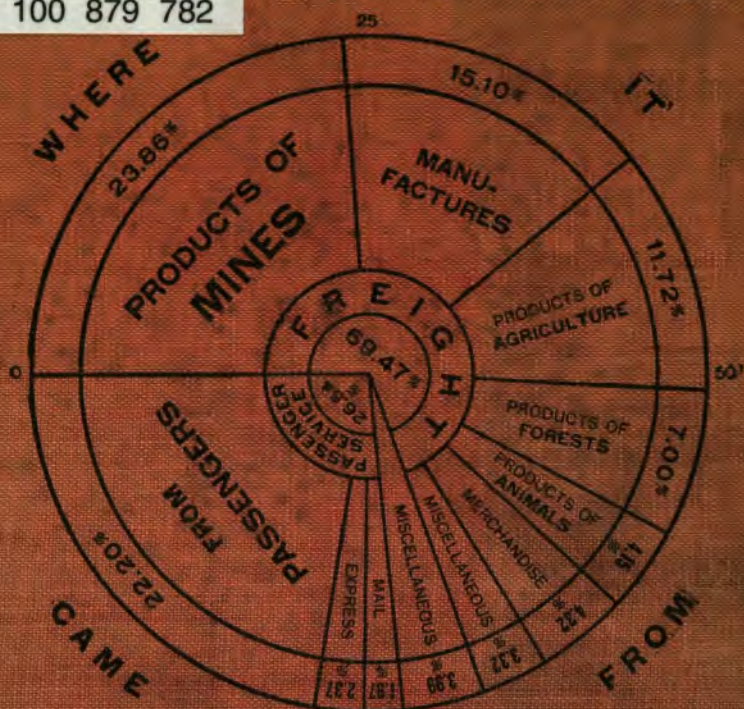
TABLE OF CONTENTS — 1913

	PAGE
INTRODUCTION.....	3
FIFTY YEARS OF BRITISH RAILWAYS.....	5
<i>From Railway News</i>	
THE MOST POWERFUL LOCOMOTIVE IN THE WORLD.....	16
THE LIVING WAGE AND THE LIVING RATE.....	17
<i>By Theodore Roosevelt</i>	
NECESSITIES OF A SUCCESSFUL RAILWAY.....	20
<i>By Samuel Rea</i>	
WHY RAILWAY MAINTENANCE COSTS MORE.....	34
<i>By J. G. Rogers</i>	
WHY MAINTENANCE OF EQUIPMENT COSTS MORE.....	37
<i>By J. T. Wallis</i>	
CERTAIN CONSIDERATIONS IN RATE MAKING.....	40
<i>By Balthasar H. Meyer</i>	
LOOKING FACTS IN THE FACE.....	50
<i>A Nebraska Farmer</i>	
ARE WAGES PAID THE RAILWAYS HIGH ENOUGH?.....	57
<i>"Traffic Expert"</i>	
WHO GETS THE LION'S SHARE OF THE HIGH COST OF LIVING?.....	62
<i>By John Duffy</i>	
PRICES AND THE RAISING OF RATES.....	65
<i>By Clement Colson</i>	
PASSENGER RATES IN BRITISH COLUMBIA.....	79
<i>By H. L. Drayton</i>	
APPORTIONMENT OF EXPENSES TO SUBURBAN TRAFFIC.....	82
<i>By C. W. Durbrow</i>	
ARE INCREASED TRAIN LOADS PRACTICABLE?.....	86
<i>By Charles F. Speare</i>	
NATIONALIZATION OF RAILWAYS: HISTORICAL ASPECTS.....	95
<i>By Dixon H. Davies</i>	
THE STATE AND THE RAILWAYS.....	105
<i>The Spectator</i>	
GOVERNMENT OWNERSHIP OF RAILWAYS.....	110
<i>By Samuel O. Dunn</i>	
THE BELGIAN RAILWAYS.....	117
<i>By M. A. Pierrard</i>	
THE PRUSSIAN-HESSIAN STATE RAILWAYS.....	120
<i>By W. J. Cunningham</i>	
GROWING FRICTION OVER MANAGEMENT OF PRUSSIAN RAILWAYS.....	139
<i>Verkehrstechnische Woche</i>	
MEDIATION AND ARBITRATION.....	146
<i>By Seth Low</i>	
FACTS CONCERNING THE "SUNSET" STRIKE.....	154
<i>The Railway Age-Gazette</i>	
LABOR UNIONS AND THE RAILROADS.....	167
<i>By J. O. Fagan</i>	
WORKMEN'S COMPENSATION.....	176
<i>By Frank V. Whiting</i>	
FAIR PAY FOR CARRYING THE MAILS.....	184
<i>By Ralph Peters</i>	
A NATION'S NEGLECT.....	202
<i>By Marcus A. Dow</i>	
THE VALUATION OF RAILROADS.....	215
<i>By Charles A. Prouty</i>	
ARE AMERICAN RAILROADS OVER-CAPITALIZED?.....	228
<i>By Alba B. Johnson</i>	
THE OHIO FLOODS OF 1913.....	235
<i>By Lewis S. Bigelow</i>	
THE NEW HAVEN SITUATION.....	254
<i>By Howard Elliott</i>	
GOVERNMENT REGULATION OF RAILWAYS.....	263
<i>By Wm. F. Herrin</i>	
CANALS AND RAILWAYS.....	278
<i>By W. M. Acworth</i>	
LEGISLATIVE REPORT OF THE PERE MARQUETTE.....	283
<i>To Michigan Legislature</i>	
THE WORLD'S GREATEST TUNNELS.....	288
<i>The Engineer</i>	
WAR TIME RAILROADING IN MEXICO.....	295
<i>By Maj. Charles Hine</i>	
THE MAN WHO DARE NOT MAKE MISTAKES.....	300
<i>By F. E. Small</i>	
RAIL PRODUCTION.....	306
<i>Iron and Steel Institute</i>	
SOME TENDENCIES OF THE TIMES.....	317
<i>By G. F. Swain</i>	
VARIOUS ROADS TO HEAVEN.....	324
<i>By Robert Burdette</i>	
THE SERVANT AND HIS WAGE.....	327
<i>By L. B. Freeman</i>	
DIAGRAM FOR INSTRUCTION OF CHINESE COOLIES.....	328
STATISTICS OF AMERICAN RAILWAYS FOR 1914.....	329
<i>By Slason Thompson</i>	

TABLE OF CONTENTS—1914

	PAGE
INTRODUCTION	3
TRANSPORTATION IN AMERICA JUST BEFORE THE ADVENT OF THE RAILROAD.....	5
Seymour Dunbar	
PROSPECTUS OF A PIONEER PRAIRIE RAILROAD.....	22
PRESSING NEED OF A CONSTRUCTIVE RAILWAY POLICY.....	31
Samuel Rea	
THE OUTLOOK FOR BUSINESS.....	39
James J. Hill	
STATE REPRESENTATION ON RAILROAD BOARDS.....	49
Edward P. Ripley	
NEEDS AND PROSPECTS OF THE RAILROADS.....	54
Symposium (J. Kruttschnitt, A. H. Smith and F. D. Underwood)	
COMMERCE AND RAILROADS.....	56
Hon. Oscar Underwood	
RATE INCREASE VITAL TO ROADS.....	62
Charles Francis Adams	
AN EX-RAILWAY COMMISSIONER ON PASSENGER RATES.....	68
C. V. McAdams	
THE PASSENGER FARE QUESTION IN OHIO.....	74
L. E. Johnson	
PASSENGER FARES IN EUROPE AND AMERICA.....	79
H. T. Newcomb	
RAILROAD VALUATION.....	83
H. H. Edgerton	
RAILWAY PROPERTY VALUATION FOR PURPOSES OF REGULATION.....	98
Pierce Butler	
THREE ILLUSTRATIONS OF RIGHT OF WAY VALUATIONS.....	110
Thomas W. Hulme	
METHODS OF RAILWAY TAXATION IN MICHIGAN.....	118
David Friday	
RAILROAD WAGES AND TAXATION.....	129
Robert LeC. Hovey	
RAILWAY MAIL PAY.....	135
W. W. Baldwin	
PARCEL POST AND ITS EFFECT ON RAILWAY REVENUE.....	139
V. J. Bradley	
WHAT THE GOVERNMENT GETS FOR CARRYING THE MAELS.....	143
Ralph Peters	
EXPRESS AND PARCEL POST.....	146
C. D. Churchill	
LOCAL FREIGHT BY PARCEL POST.....	149
<i>Railway Age-Gazette</i>	
THE PERSONAL INJURY PROBLEM.....	151
George Bradshaw	
SAFETY AND SHORT TRAINS.....	162
Marcus A. Dow	
LIMITING LENGTH OF TRAINS BY LAW.....	175
M. W. Potter	
SHALL THE GOVERNMENT OWN THE RAILROADS.....	177
Seth Low	
PROSPECTS OF STATE OWNERSHIP IN ENGLAND.....	182
W. M. Acworth	
OBJECTIONS TO GOVERNMENT OWNERSHIP OF RAILROADS.....	186
Hon. Jonathan Bourne, Jr.	
THE WORLD'S EXPERIENCES IN GOVERNMENT OWNERSHIP.....	202
R. H. Tingley	
TEN GREAT ARMIES OF AMERICAN RAILWAY LABOR.....	214
The Annalist	
THE RAILWAYS IN TIME OF WAR.....	221
H. G. Smith	
FRENCH RAILWAYS IN WAR.....	228
<i>Railway Gazette</i>	
FRANCE SAVED BY HER RAILROAD MEN.....	231
Walter S. Hiatt	
GERMAN STATE RAILWAY MANAGEMENT.....	236
<i>Springfield Republican</i>	
ITALIAN RAILWAYS IN THE WAR.....	242
<i>Chicago "Tribune"</i>	
GERMANS BUILDING RAILWAYS IN BELGIUM.....	243
<i>Railway Gazette</i>	
THE RAILWAYS OF RUSSIA.....	244
M. Edward Thery	
BRITISH RAILWAYS DURING THE WAR.....	252
<i>Nineteenth Century</i>	
THE WAR AND WALL STREET.....	262
W. C. Van Antwerp	
EFFECT OF THE WAR ON PICES OF AMERICAN RAILWAY BONDS.....	291
Lewis B. Franklin	
SAFETY FIRST.....	292
R. C. Richards	
SAVE YOUR LIVES!.....	296
Long Island R. R. Bulletin	
REJECTED TRUTHS ABOUT RAILROADS.....	297
C. H. Markham	
STATISTICAL CONTROL OF RAILROAD OPERATION.....	302
W. M. Baxter	
THE EXPRESS (VERSE).....	308
R. Gorell Barnes	
NEW UNION PASSENGER STATION AT KANSAS CITY.....	311
LARGE RAILWAY STATIONS OF THE WORLD	
317	
AMERICAN RAILROAD SECURITIES HELD ABROAD.....	318
L. F. Loree	
FIVE PER CENT FREIGHT RATE CASE, Philadelphia Board of Trade.....	319
STATISTICS OF AMERICAN RAILWAYS FOR YEAR ENDING JUNE 30, 1914.....	325
Slason Thompson	





The shaded circle shows 75% Operating Expenses and Taxes

The Black Belt beyond 70% is the Danger Zone.